Pit and Quarry
With which is consolidated CEMENT-MILL & QUARRY
Member Audit Bureau of Circulations
Read in Largest Number of Plants
Vol. XXIII CHICAGO, MARCH 23, 1932 No. 13

New Cement Mill for the Lehigh Valley Area

SALE OF SECURITIES APPROVED

Approval of the sale of $2,700,000 in securities has been granted the newly-formed National Portland Cement Co. by the state of Pennsylvania and the company, through its vice-president, Fred B. Franks, has announced that plans are going forward for the construction of a plant at Brodhead, Pa., in the Lehigh Valley district, to have an ultimate capacity of 1,250,000 bbl. annually.

A 204-acre tract, underlain with cement rock, has been acquired and construction of the office building is reported to be already under way.

Officers, besides Vice-President Franks, include: Robert H. Anderson, Ambler, Pa., president, and Louis Rafetto, Philadelphia, secretary-treasurer. Directors are Harold F. Ricker, Easton, Pa.; Albert H. Ott, Bethlehem, Pa.; L. Elwood Dize, Crisfield, Md.; Ira W. Richards, Easton; Arthur P. Hauser, Emaus, Pa.; and J. M. Schoenly, Bethlehem.

Andrew P. Hachtmann of Allentown, formerly connected with the Atlas Portland Cement Co. and the Fuller-Lehigh Co., will be chief engineer.

According to reports, only high-early-strength cement will be produced. General offices are to be located in the Finance Bldg., Philadelphia. Plant details are said to include a structural-steel rock, clinker and gypsum storage building 80 ft. by 500 ft. in ground area, nine 30-ft. slurry silos, twelve 30-ft. cement-storage silos, a 120-ft. by 400-ft. kiln building, a 60-ft. by 240-ft. coal grinding and storage building, and a machine shop and storehouse 60-ft. by 220-ft.

California Gravel Plant Invests to Raise Output

A. C. Root, who has operated a crushed-stone plant and quarry at Woodlake, Cal., for many years, recently interested San Francisco capital in the enlargement of his operations and improvements costing about $125,000 are being made at the plant. A large gyratory crusher has been installed and the capacity of the operation raised to 1,000 tons per day.

Contracts were recently closed by Mr. Root to supply the Union Paving Co. with 30,000 tons of stone for use in laying down pavement between Tulare and Tipton, Cal. Another large outlet for former waste material will be in supplying agricultural lime to growers in the vicinity.

To Build $75,000 Gravel Plant Near Peoria, Ill.

The Lake Erie Mining Co. has leased a tract of sand-and-gravel deposits near Peoria, Ill., for a term of ten years and will immediately begin the erection of a plant to cost approximately $75,000. The land was leased from the Peoria & Pekin Union Railway Co. and the transaction has been approved by the Illinois Commerce Commission. The rental is to be $125 per month.

Dewey Lands Important Cement, Stone Contracts

The Dewey Portland Cement Co. of Kansas City, Mo., has been awarded a contract for 285,000 bbl. of cement to be used by the government in the construction of a dam and sea-wall at Davenport, Ia., during the year. The company also won the award for supplying 145,000 tons of crushed-stone aggregates. The cement and stone will be supplied from the company's Portland-cement plant and quarry located at Linwood, Ia., near Davenport.

Huge Highway-Building Program Spurs Activity

Aggregates plants and road builders in Southern California are reported to be extremely busy following the state's decision to push work on its $23,000,000 highway-construction program.

Concrete, bituminous and surface-treated roads are included in the big program.

Dismiss Monolith Suit Demanding Receivership

Action of a small group of stockholders asking that a receiver be appointed for the Monolith Portland Cement Co. was denied in federal court at Los Angeles when it was shown that total assets were 11 times total liabilities of the company.

Extend Organization of Agstone Institute

ACTIVE IN MIDWEST STATES

The Midwest Agricultural Limestone Institute was organized Dec. 1, 1931, "to create a forum for the open discussion of problems confronting the agricultural limestone industry and to attempt their solution; to obtain and distribute educational matter of value to this industry; to collect and distribute statistics of value to this industry; to standardize and improve the quality of agricultural limestone and promote its greater use, and, to promote agriculture and soil improvement."

In February, 1932, it was incorporated in Illinois under the law for the formation of corporations not for pecuniary profit. The "Institute will attempt to serve a territory consisting of the state of Illinois and its surrounding adjoining states." For organization purposes this territory is divided into five districts: the Northern (or Chicago producing district), the Central (or Kankakee-Joliet producing district), the Southern (or East St. Louis-Southern Illinois producing district), the Western (or Iowa producing district), and the Eastern (or Indiana producing district).

Any producer or distributor of agricultural limestone engaged in business within the territory served by the Institute may become a member upon payment of an initiation fee.

At present the Institute has twenty-eight members, divided as follows: Northern district, four members; Central district, four members; Southern district, eight members; Western district, five members; Eastern district, seven members.

Enlarged Barge Service to Serve New Terminal

Five or seven additional barges are to be purchased by the Marquette Cement Manufacturing Co. this year for the extension of its Mississippi River service southward from Memphis to Vicksburg, Miss., where another packing and distributing plant is to be erected, according to reports. Plans for the erection of the terminal, which will cost in the neighborhood of $100,000, are now being drawn.

Construction Awards Show Seasonal Gain

FEBRUARY TOTAL $89,045,800

A gain of almost 5 per cent. in construction awards during February as compared with the low figures of January reflects a normal rise approximating seasonal proportions, according to the F. W. Dodge Corp. Losses from February, 1931, were registered in all four of the major construction classes with public utilities making the best relative showing and public works and residential building the poorest comparisons.

The $89,045,800 total in new construction awards for February was divided among the four major construction classes with $24,417,300 going to residential building, $36,347,700 to non-residential building, $15,633,400 to public works, and $12,647,400 to public utilities.

For the first two months of 1932 construction awards of all descriptions in the 37 states east of the Rockies are reported by the F. W. Dodge Corp. to amount to $173,844,200. The four major classes were represented in this total as follows: $51,921,600 in residential building, $69,585,400 in non-residential building, $35,127,400 in public works and $17,209,800 in public utilities.

Compared with January six territories reported contract gains in February. These were the Southeastern with $5,570,100 in new contracts; the Chicago district with $17,196,900; the Central Northwest territory with $3,161,300; the Kansas City territory with $5,665,300; the New Orleans territory with $3,214,000; and the State of Texas with $7,078,000.

Not one of the thirteen districts comprising the 37 states east of the Rockies was able to show February contracts ahead of those reported for a year ago; but the best relative comparisons were made in the Central Northwest, Chicago, Kansas City and Texas territories.

Revision of Anti-Trust Laws Faces First Test

Pressure continues to be brought to bear upon Congress for legislation looking toward the revision of the anti-trust laws during the present session. Present destructive competition, resulting in the lowering of wages, makes it imperative that something be done to release producers from the drastic regulation of industry which still exists.

Perhaps the most outstanding test of the anti-trust laws now proposed concerns the so-called regional sales-agency plan of the bituminous-coal industry. Legality of this plan is to be tried in the courts through an agreement reached between the Department of Justice and Appalachian Coals, Inc.

Workers Subscribe for U. S. Steel Stock at 40

Thousands of employees of the Universal Atlas Cement Co. and the Michigan Limestone & Chemical Co. have subscribed to common shares of the United States Steel Corp. of which both companies are subsidiaries, according to an announcement. Workers were offered the stock at the subscription price of $40 per share, payable out of wages and salaries. This was said to be the lowest price the stock had ever been sold to employees.

Applications for subscription at the $40 price closed Saturday, March 5. Employees who subscribed were apparently satisfied with the desirability of their purchases as the stock closed at 50¾ on that day.

Cowell Fires Up Lime Kilns at Rincon, Cal.

After having been "cold" for many months, the kilns at the lime plant of the Henry Cowell Lime & Cement Co., at Rincon, Cal., near Santa Cruz, have been fired and the outlook for an uninterrupted run of several months is said to be in prospect.

Quarrying has continued, however, during the period in which the kilns were idle and a large stock of raw material has accumulated.

Fire, Explosion Damage Plant Blacksmith Shop

Fire which followed the explosion of an acetylene tank caused $1,000 damage in the blacksmith shop of the Portsmouth Sand & Gravel Co., of Portsmouth, O., on March 1.

B. F. France, a welder employed in the plant, had a narrow escape from being burned when he dashed through the flames in the burning building to safety.

Dealers See Slight Chance for Upturn

MAJORITY PREDICT NO CHANGE

Will construction in 1932 equal or exceed that of 1931—or will it be less than that of last year?

That was the question the Universal Atlas Cement Co. asked approximately 6,000 dealers in all sections of the country in a survey just completed by the company. The table at the bottom of the page records the answers. As the totals indicate, 48 per cent. felt that business this year will be about the same as last. About 30 per cent. of the dealers think that there will be less activity this year than last, while 20 per cent. were optimistic, declaring that more construction is in prospect during the present twelve-month period.

Answering the question: "What is the present trend of business in your locality?", 33 per cent. of the dealers reported an improvement; 44 per cent. indicated no change; and 23 per cent. reported a decline.

On the subject of employment, 16 per cent. saw an improvement in conditions. Fifty-seven per cent. opined that no change was in prospect in the immediate future, while 27 per cent. reported a tendency toward even less employment.

Comments ranged from predictions of an immediate pick-up, such as this remark of one dealer—"1932 will be much better"—to such statements as "during the next 15 years the writer doesn't see any likelihood of material improvement!"

Thunder Bay Quarries Facing Heavy Schedule

With the opening of navigation scheduled for April 20 or earlier, Thunder Bay Quarries Co. will shortly resume production at its new plant at Alpena, Mich., on a schedule of 24 hours per day.

A force of nearly 100 men has been engaged throughout the winter in stripping the deposit, which was opened late last summer when the new operation first went into production. Most of the overburden has been loaded to railway cars and carried to the shore-line of the company's property on Lake Huron, where it is being used for fill-in purposes.

WHAT CEMENT DEALERS THINK OF 1932 CONSTRUCTION PROSPECTS AS COMPARED TO 1931

Region	Commercial Construction			Residential Construction			Farm Construction			Highway Paving			Street and Alley Paving			Public Building Construction			Sewer and Waterwork Construction			Public Utility Construction			Total for Region (*All Classes*)		
	More	Same	Less	More	Same	Less	More	Same	Less	More	Same	Less	More	Same	Less	More	Same	Less	More	Same	Less	More	Same	Less	More	Same	Less
Eastern	22	98	50	63	84	30	47	87	30	34	65	48	50	62	60	36	75	55	29	86	39	14	85	52	295	642	364
Southern	16	48	39	28	46	29	27	54	21	11	33	53	24	36	41	18	24	58	9	44	45	9	46	42	142	331	328
Central	30	148	75	78	133	56	107	108	47	29	121	76	52	98	87	35	123	89	36	124	70	20	138	65	387	993	565
Northwestern	9	69	45	39	61	33	52	50	32	16	53	37	25	49	35	12	63	43	15	64	35	12	67	30	180	476	290
Rocky Mountain & Pacific Coast	18	38	17	35	30	9	25	26	18	14	35	23	17	32	22	14	29	31	12	38	22	9	41	19	144	269	161
Total	95	401	226	243	354	157	258	325	148	104	307	237	168	277	245	115	314	276	101	356	211	64	377	208	1148	2711	1708
Percentage	13	55	32	32	47	21	36	44	20	16	47	37	25	40	35	16	45	39	15	54	31	10	58	32	20.7	48.6	30.7

Urge Construction of Good Roads Continue

N. Y. GROUP MEETS AT UTICA

At the March 10 meeting of the New York State Crushed Stone Assn. at Utica, N. Y., the main topic of discussion was the state appropriation for highway construction this year, which from all appearances will be drastically cut. While every effort has been made by the state contractors' association, the state crushed-stone, and the sand and gravel producers by sending representatives to Albany to make a plea for an increased appropriation, it appears very unlikely that anything will be accomplished in this direction by the session of the legislature which closed March 11.

A bill for an appropriation of $30,000,000 to be raised by a bond issue for unemployment relief is being presented. This money will undoubtedly be provided at the expense of funds for highway construction. It is the firm belief of producers that this money—or a considerable portion of it—could be much better spent in effecting unemployment relief by distributing it through the channels of highway construction. With this thought in mind it was suggested that members of the New York Crushed Stone Assn. request that their employees write letters and send telegrams to their state legislators and to local politicians urging them to use their influence to this end. It further developed, through a check-up at the meeting, that this was already being done by the various members of the association. However, it was strongly urged that this plan be consistently followed up with the thought that, even if it were not productive of immediate results, it could not fail to have its effect upon future activities.

It seems to be the feeling that, although nothing can be accomplished toward increasing the highway construction appropriation at this session of the legislature, an extra session will be called and that something can be accomplished to benefit the situation at that time.

A resolution was passed directing the secretary to write a letter to the Associated General Contractors of America, expressing their appreciation of the efforts and work done at Albany on the highway-construction program.

For several years washing has been compulsory for sand and gravel in this state, and it was planned to make it so for crushed stone. However, in view of the slashed highway budget and the fact that the producers' market had been so drastically cut, the state highway commissioner worded the specifications to read "washed or cleaned." No definite interpretation was given the word "cleaned," although it implies a "mechanical process." No definite recommendations or instructions are stated.

The following persons were present:

Adams (C. A.), Rotterdam Junction, N. Y.
Babcock (B. R.), Callanan Road Improvement Co., Albany, N. Y.
Barnes (H. E.), Sweeney & Boland, Rochester, N. Y.
Blades (A. L.), Blades Stone Co., Hornell, N. Y.
Bucholtz (C. R.), Genessee Stone Products Co., Stafford, N. Y.
Caldwell (A. B.), Genessee Stone Products Co., Stafford, N. Y.
Clark (Harvey), Dolomite Products Co., Rochester, N. Y.
Crote (L.), Solvay Process Co., Syracuse, N. Y.
Cushing (J. E.), Cushing Stone Co., Schenectady, N. Y.
Heimlich (J. L.), Le Roy Lime & Crushed Stone Corp., Le Roy, N. Y.
Merchant (G. E.), Le Roy Lime & Crushed Stone Corp., Le Roy, N. Y.
Odenbach (John H.), Dolomite Products Co., Rochester, N. Y.
Owens (A. S.), Eastern Rock Products, Inc., Utica, N. Y.
Owens (F. C.), General Crushed Stone Co., Syracuse, N. Y.
Randle (A. W.), PIT AND QUARRY, New York, N. Y.
Rainer (H. E.), Federal Crushed Stone Corp., Buffalo, N. Y.
Rice (John, Jr.), General Crushed Stone Co., Easton, Pa.
Rockwood (N. C.), *Rock Products*, Chicago, Ill.
Russell (H. J.), Jointa Lime Co., Glens Falls, N. Y.
Rutschow (Fred), Mohawk Limestone Products Co., Mohawk, N. Y.
Ryan (Jos.), Ryan Quarries, Albion, N. Y.
Savage (James), Buffalo Crushed Stone Co., Buffalo, N. Y.
Schaefer (Geo. E.), General Crushed Stone Co., Rochester, N. Y.
Scott (J. K.), General Crushed Stone Co., Le Roy, N. Y.
Sickles (A. S.), Dolomite Products Co., Rochester, N. Y.
Snyder (N. S.), Link-Belt Co., Chicago, Ill.

Texas Potash Corp. Will Develop Virgin Deposit

On the basis of test holes drilled on the 23,000-acre ranch of O. P. Jones near Midland, Tex., geologists estimate that the tract is underlain with a bed of potash aggregating more than 57,000,000 tons. Mr. Jones has leased the potash rights to part of the ranch to the Texas Potash Corp. of Dallas, which will soon begin sinking a shaft preparatory to starting mining operations.

The company plans to construct a refining plant in connection with its development project.

Cost of Producing U. S. Fluorspar Investigated

An investigation into the differences in production costs existing between fluorspar in the United States and competing foreign countries is being conducted by representatives of the United States Tariff Commission. The study was ordered by the Commission in January.

Briar Hill Stone Co. to Operate on Larger Scale

Production on a larger scale and the reopening of another of its quarries has been announced by the Briar Hill Stone Co., of Millersburg, O.

Assurance of the increased operations was given recently by C. B. Blum, secretary of the company.

No Present Need for New Buildings—Avery

U. S. GYPSUM CUTS OVERHEAD

The United States Gypsum Co. has been able to reduce its overhead in line with a smaller volume of business, and for the first six months of this year it will be about 30 per cent. less than in like period a year ago, according to budget figures. At present expenses are running about 3 per cent. less than the projected budget. During the past few months the company's expenses have shown a consecutive monthly decline and present indications are that March overhead will be less than in February, according to the *Wall Street Journal*.

Instead of discharging its competent junior executives, the management has worked out a plan whereby they are in a sense temporarily demoted to other positions. Employees have shown complete willingness to coöperate in this respect, Sewell L. Avery, president, declares.

There is no immediate need for new building, according to Mr. Avery, and in his estimation there is nothing which can bring about an increase in new construction in the near future. Although remodeling and repairing make up the bulk of present construction, the company is in a position to benefit from this type of work because it has a complete line of wall board and tile which is used extensively for this purpose.

Through its expansion program the company prepared for the present depression since through its larger units of production and distribution it effected economies of operations and received a larger portion of the total business.

Stockholders voted to set aside 5,500 shares of the company's common stock to be sold to executives at current market prices.

New Plant in Arkansas Uses Modern Equipment

The Washed Sand & Gravel Co., of Jonesboro, Ark., has started work on the erection of a modern sand-and-gravel plant at Laird, Ark., near Jonesboro. The plant will be located on the Cotton Belt Railroad. Most of the heavy machinery is on the site, according to Thomas B. Laird, general manager. Screens, scrubbers and classifiers are to arrive shortly and the plant is expected to be in operation by summer. A wide range of washed, crushed and screened material will be produced. The operation will have a daily capacity of at least 30 carloads of material when completed, according to Mr. Laird.

Water for washing purposes will be obtained from an artificial lake covering an area of five acres and will be pumped to the plant by a Byron-Jackson No. 8 centrifugal pump.

Editorial

Time to Prepare

THERE never was a more auspicious time than the present for the improvement of production facilities. And, what is more, there is not likely to be a more auspicious time in the future, unless business falls into a deeper abyss than the present one.

With production at low ebb the opportunities for changing production methods would seem to be exceptional. Obsolete machinery can be replaced, worn equipment can be repaired, entire operations can be rearranged with less disturbance to necessary operations, to regular production schedules, than at times of continuous and large output. In our industries the periods of relatively low activity have always been utilized for rehabilitation. The loss that came from the idleness of slack seasons has always been considered as having an offsetting advantage in the opportunity they afforded for making necessary improvements. In the present period this slackness is more general and, in some cases—particularly where stocks of finished material have accumulated in sufficient quantities to take care of the market's demands for a few months—has resulted in complete stoppage of operations with the resulting advantage that the fear of interrupting production, which has deterred many men from undertaking large-scale improvements in better times, is not now operative to the same extent.

The leisure which slack business provides has been seized by many shrewd business men as a time for careful study and planning, with the result that it is undoubtedly true that producers as a class are much better prepared mentally for dealing with the hypercompetitive conditions which will come with the return of better conditions. This is a decided gain, the effects of which will be evident in the degree of success which such men will achieve in those new conditions. But planning is only a part of the task with which our industries are faced. The best plans grow old, all require revision, and many of them will be abandoned for better ones. The chief value of a plan is in the ability it provides for intelligent provision for such future needs as can be anticipated. Unless acted upon, however, its greatest possibilities remain unutilized; it never reaches fruition.

Those producers who have lately made a study of prices must have been struck with the exceptional values that can be had. It is doubtful if the cost of new and more efficient equipment has ever stood in as favorable a relation to the earning power of that equipment as at present. There are numerous reasons why this is so. The same leisure that has been profitably employed by so many producers in intelligently studying the needs of the near future has been utilized by equipment manufacturers in bettering their products. A lessened demand for their machinery has increased the need for improving it, for in the present situation, when price is considered the all-powerful key to sales expansion, increased values are the goal of all buyers. As an immediate result, it is possible, in the case of almost every type of equipment, to buy better values (measured by the tests of quantity, quality, and cost of output) than have ever been obtainable, to pay less for it, and to purchase it on more favorable terms.

These gains are augmented by the advantages obtainable from doing construction work at present prices. Building construction of all kinds can be carried on at prices that are as far below the value of the service rendered as the prices of building materials are below their actual worth. The producer who is able, because of foresight and confidence, to take advantage of the opportunities available will stand in a more favorable competitive position than his rivals who defer to the coming period of higher prices the improvements which even the most casual consideration shows to be necessary now.

Nobody needs to be told of the severity of present-day competition; the profit-and-loss accounts of producers in all lines of business attest the terrible cost at which sales have been made and the low prices at which orders have been accepted. But it may not be equally clear that low prices may prevail for some time to come. The prosperity to which we became accustomed in the years preceding the present period—and by that is meant and will be understood the time when few men questioned price or cost because both could so easily be passed on to the buyer — will not return with cataclysmic suddenness, and we may be thankful that it will not. In the period of reconstruction prices will gradually rise—possibly to the old levels, possibly higher than the old levels—but greater demands will be made for true values, and prices, whatever their relation to former prices, will be scrutinized as never before.

The competition of the coming period will be the hardest industry has seen, in our opinion. It will be a competition of intelligence, a rivalry between students, planners, real thinkers and workers; not a series of petty squabbles between price-cutting manufacturers who in the present period have attempted to equalize differences of intelligence by differences of price. There will be little acceptance of inferior products simply because their prices may be low. Instead, there will be an insistence upon superior products and a demand that they be provided at prices comparable to the low-quality prices of to-day. The producer who can fatten in a period of prosperity, when buyers are soft, good-natured and uncritical, will not be able to survive in the coming era, when buyers will be harder, perhaps somewhat soured, and more exacting.

Present-day methods will not suffice in the new era, because they are the outgrowth of the slipshod methods of prosperity. There will be no room for the producer who can not supply a high-quality

product at a reasonable price. Under prosperous conditions in the past he has been able to sell products that are inferior (when judged by the coming standards) at top prices, relying on those high prices to overcome the defects of a system that tolerated inefficiency and to make profits easy and seemingly secure. But during the last few years demand has fallen off, in spite of what was too often considered the stimulus of falling prices, and profits have shrunken to little or nothing, because that efficiency necessary to low-cost production was lacking and it could not be supplied at once. To maintain prices at their present levels or even at levels somewhat higher will require greater refinement in production methods than industry has yet found necessary. Profits of the future will come principally from reductions in the cost of production, not from a return of prices to their former levels. Until producers realize the inevitability of this they can not prepare themselves adequately for survival. To hope for a return of the easy profits of former years is to cherish an expectation that is certain not to be fulfilled, yet this will be the method followed by many who are either unwilling or unable to gird themselves for a fight which will be carried on with the weapon of value rather than price.

There is every reason to believe that business will not only recover but that the consuming power of the people will continue to increase, even more rapidly than the growth of population. This is an inevitable consequence of our belief in and demand for a continually rising standard of living. Yet there is no great prospect of the number of producers being greatly increased in view of industry's harrowing experience with overexpansion in the recent past. Accordingly there will be a general increase in production and producers who expect to survive must be prepared to take care of it. But the problem will be considerably different from that which has faced industry in the past. Instead of the cry for more and more production—the demand that has taught industry its bad habits of large volume and high prices regardless of quality or service—there will be a call for better and better products and a demand for price justification.

Industries of all kinds are being driven, however reluctantly, to a study of their problems and opportunities. The wisest business men have been engaged on such a study for some time, have reached their conclusions, and have already acted or are soon to act upon them. The result will be an extensive revision of production facilities, with emphasis placed on the quality of the product and the cost of producing it. Too many men, however, are hesitating, waiting perhaps for some magical recovery and a return to the "good old days" of insatiable demand, guillible buyers, high prices, and easy profits. In our opinion they will not return. They never should have found a place in our general economy because they were based on a widespread indifference to quality instead of on a demand for and a willingness to give genuine service.

The future holds plenty of opportunity for business, but its rewards will go to the intelligent, the studious, the thinking, and the careful. The dull, the laggard, the quacks, and the make-believers will have a harder time than ever before, because buyers as well as producers have been thinking, observing and learning, and their patronage will not be awaiting the beck and call of every clever device of the scheming seller. The same methods which have "taken in" the buyer for many years have lately taken him out of the market, with the resulting collapse of business which everyone has seen and felt.

This is the time to get ready. Business has had nearly three years in which to observe its troubles, analyze their causes, and develop remedies. All the necessary observing and analysis should have been done by now; the present is the time for action. In every industry, as well as in our own, this means physical preparation for the coming period of better business, better products, better prices, and better profits. The man who is unprepared to meet the coming demand for quality products and to supply them at reasonable prices and at a profit to himself will not long remain a factor in the industry to which he now belongs. He may have escaped detection in the general uproar of "boom" times, but he will be a conspicuous exception in the good and sensible period to come.

The Sales Tax on Concrete

PRODUCERS of ready-mixed concrete are faced with a real problem in the threat of discrimination presented by the prospect of a sales tax on their product. The discrimination arises, as pointed out elsewhere in this issue, from the fact that the proposed tax, if levied in strict accordance with the provisions of the pending bill, would place a heavier tax on ready-mixed than on job-mixed concrete.

If the wholesale plant cost of the materials entering into the production of a cubic yard of job-mixed concrete be taken as $2.50, the proposed sales tax of 2¼ per cent. would amount to only 5.62 cents. The same rate of taxation, applied to the same quantity of ready-mixed concrete, having a plant price of $6, would produce a tax of 13½ cents. The difference of approximately 8 cents would necessarily be absorbed by the ready-mixed-concrete producer—that is to say, it would be taken out of his profit—in order to enable him to compete with the maker of job-mixed-concrete.

Under present economic conditions this is a discriminatory burden too great for any business to bear. At best, competition is severe, but at present it is all but ruinous on account of price concessions and the scarcity of business. The added penalty of 2¼ per cent. may often represent the entire profit on a transaction and wherever it can not profitably be absorbed, it may mean the loss of business. The Ways and Means Committee should lend a sympathetic ear to the pleas of ready-mixed-concrete producers, and the latter should immediately make their situation known to their representatives and senators. The National Ready-Mixed Concrete Association is working indefatigably in its members' behalf, but much strength can be added to its efforts if individual producers, non-members as well as members, will act separately in their own interest.

Drillers working on one side of No. 1 glory hole preparing to blast a slice of rock to loading tunnels below.

Cement Producer in California Quarries Stone by Glory-Hole Method

By L. R. DAVIS
Quarry Superintendent,
Santa Cruz Portland Cement Co.

IN a description[1] of the plant of the Santa Cruz Portland Cement Co. at Davenport, Cal., mention was made of the efficient glory-hole system being used to procure limestone for the plant. Here the author gives a description of this phase of the operation and the results obtained through the adoption of the glory-hole method.

THE plant of the Santa Cruz Portland Cement Co. is at Davenport, Cal., about twelve miles up the coast from Santa Cruz toward San Francisco, being built on a sloping site almost within stone's throw of the Pacific Ocean. The company's quarry is situated a little over three miles due north of the plant in the San Vicente Canyon in the foothills of the Santa Cruz Mountains.

This deposit is in the nature of an island of limestone floating in the intrusive grano-diorite batholith that underlies the mountain system. It is roughly 4,000 ft. long, 1,200 ft. wide, and is known to be over 500 ft. thick for at least 3,000 ft. As might be expected from its contact with the batholith, the stone is a semi-metamorphosed marble, with almost complete obliteration of bedding-planes, jointing, and any possible fossil remains. But there are numerous major and minor faults, water cavities or watercourses often filled with clay or sand, and some more or less horizontal bands of intrusives, locally called "blue-stock." The deposit is cut through from one end to the other by a deep and, in places, narrow ravine, through which ran San Vicente Creek.

The deposit was originally opened as a conventional quarry at an elevation of about 90 ft. above the present track level. Work was started with hand loading by contract and then, during and after the war, by railroad-type steam-shovels. At that time the coarse crushers and suitable loading bins were built at the quarry. As the work progressed and the working places were pushed back, it became necessary to work under faces 300 to 400 ft. high, very difficult to control during the heavy rains of the winter seasons. The spring and autumn rains of 1922 caused several heavy slides, chiefly of overburden. This necessitated either abandoning the deposit or finding a different system of attack.

Robert A. Kinzie, of metal mining experience, was called in as consulting engineer. Extensive diamond drilling proved that an immense tonnage of desirable limestone was still available, so it was decided to install a system dependent upon gravity and to take advantage of the high banks. At the

[1] *Steady Improvement in Grinding Methods Aids Cement Mill's Efficiency,* PIT AND QUARRY, *March 9, 1932, p. 45-53.*

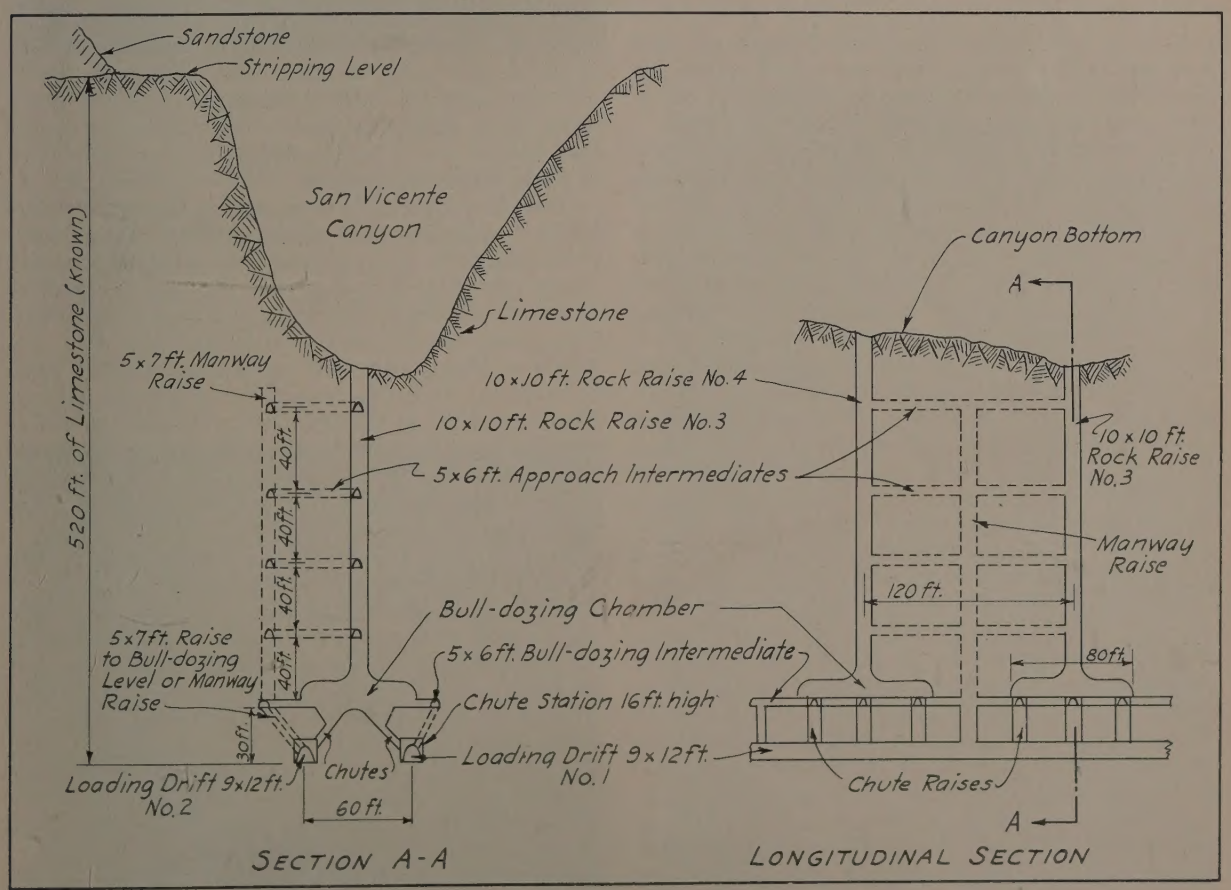
same time plans were laid to strip off the overlying waste material.

Ample haulage equipment consisting of two 18-ton electric trolley locomotives, 67 cars, and more than 3 mi. of 50-lb. rails and trolley-wire, etc., was purchased. The locomotives and cars are narrow gage—36 in.—so the old standard-gage track had to be narrowed to suit. The cars are of the solid box type, capacity 253 cu. ft. and are equipped with standard couplings, railroad-type running-gear, and all the necessary air-brake equipment. The grades favor the loads and reach 2.1 per cent. in one place. The cars are dumped one at a time by an electrically-operated tipple directly into a No. 18 gyratory crusher at the plant. As it was planned to do the loading from chutes, the cars were given double bottoms with 3-in. fir planks between.

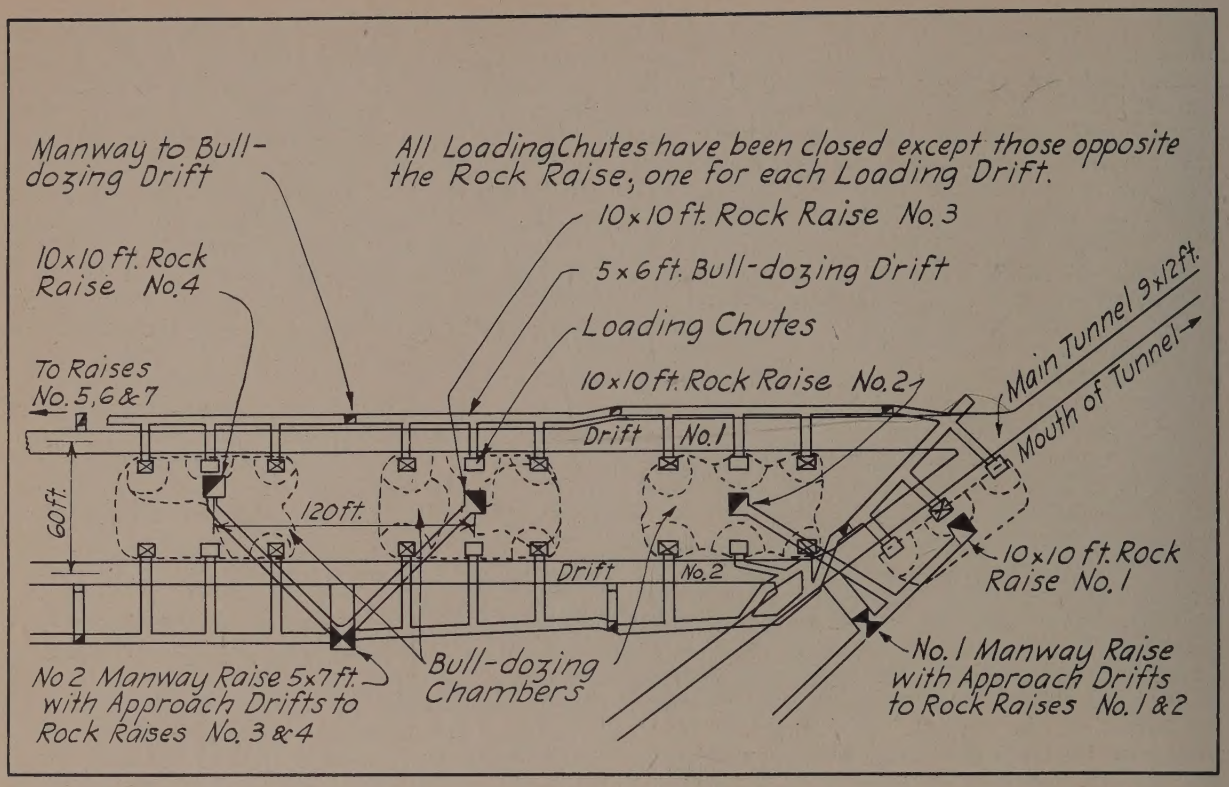
A 9-ft. by 12-ft. tunnel, on the level of the haulage track, was driven directly beneath the floor of the old quarry to intersect a point beneath the bottom of the canyon and the untouched part of the deposit. After reaching this point two parallel 9-ft. by 12-ft. drifts, on 60-ft. centers were turned off following the bottom of the canyon. Then, at intervals of 120 ft., in the center of the pillar between the two drifts, 10-ft. by 10-ft. raises were driven to the bottom of the canyon. The height of No. 1 raise from the track level to the surface was 190 ft. and the corresponding distance in No. 7 raise was 270 ft.

Reference to the accompanying sketches will make clearer the interrelationship of the various parts of the system. The rock raises themselves might be likened to elongated hour-glasses. The cone at the top is the upper container, the 10-ft. by 10-ft. raise the elongated connecting neck, the lower container being the so-called "bull-dozing" chamber.

The purpose of the "bull-dozing" chamber is to give another chance to easily get at the large pieces that may have escaped block-holing on the surface, and a chance to control the flow of the material through the loading chutes to the cars on the track 30 ft. below. As soon as the 10-ft. by 10-ft. raise reaches the surface it is very greatly enlarged or coned to act as a collecting funnel for the rock broken on the sides of the canyon above. The major difficulty that besets all glory-hole systems is the "hang-up," caused either by a single big rock, an arch caused by several smaller ones, or by damp clay. The small 5-ft. by 7-ft. man-way raise, connected to the rock raises by small 5-ft. by 6-ft. drifts at intervals of 40 ft., is the answer to this "hang-up" difficulty. The accompanying sketches show its position with regard to the rock raises. When a "hang-up" occurs in a rock raise that is too high up to be reached from the "bull-dozing" chamber, two men working together can quickly get to the trouble, without taking any undue risk, by working in the nearest man-way drift. They can always get closer to it than 40 ft. and still stay under the solid-rock



Cross-section showing lay-out of glory-hole system and illustrating method of operation.


Manway to Bull-dozing Drift
All Loading Chutes have been closed except those opposite the Rock Raise, one for each Loading Drift.
10x10 ft. Rock Raise No. 3
5x6 ft. Bull-dozing Drift
Loading Chutes
10x10 ft. Rock Raise No. 4
To Raises No. 5, 6 & 7
10x10 ft. Rock Raise No. 2
Main Tunnel 9x12 ft.
Mouth of Tunnel
Drift No. 1
60 ft.
120 ft.
Drift No. 2
10x10 ft. Rock Raise No. 1
No. 1 Manway Raise with Approach Drifts to Rock Raises No. 1 & 2
No. 2 Manway Raise 5x7 ft. with Approach Drifts to Rock Raises No. 3 & 4
Bull-dozing Chambers

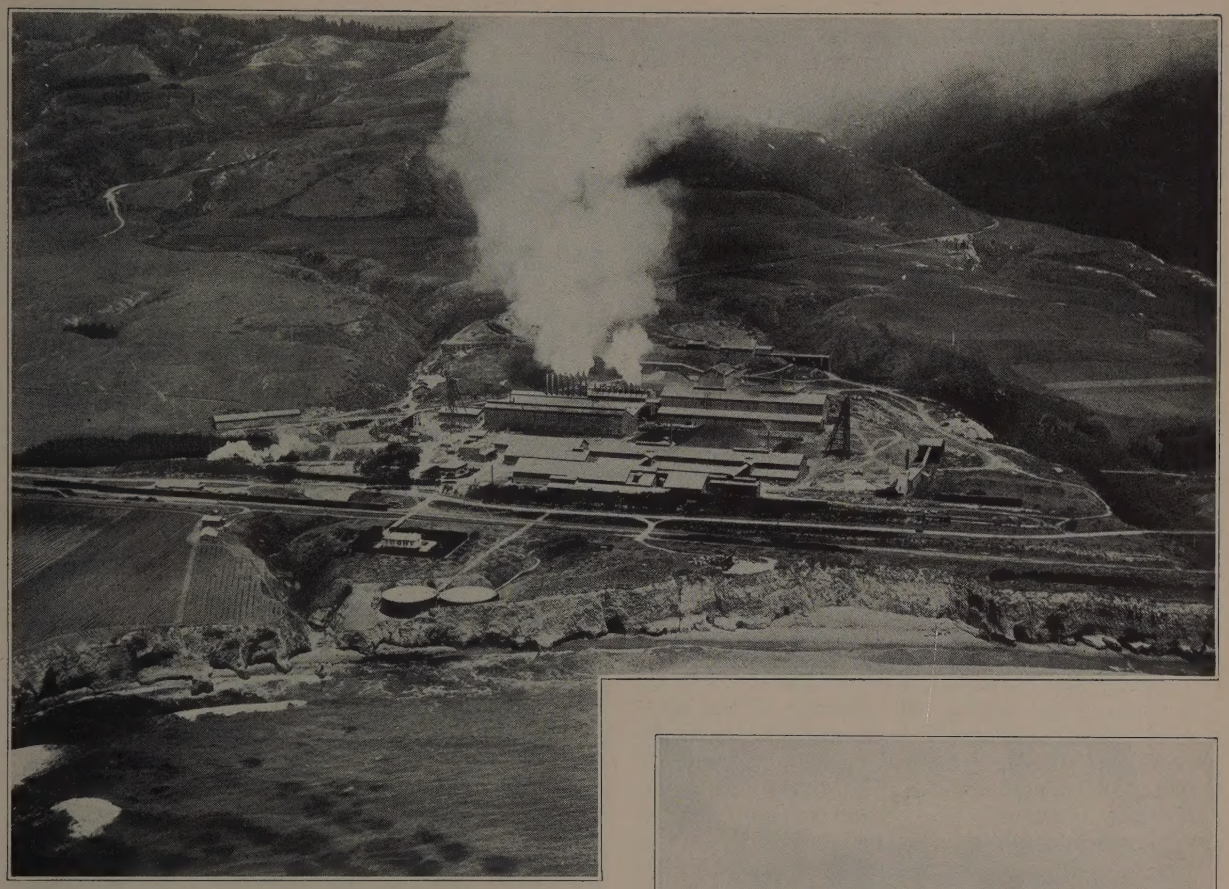
Plan of glory-hole lay-out showing connection of loading drifts to main tunnel and arrangement of rock raises, loading chutes and manways.

roof of the drift. The most serious "hang-ups" that have occurred in this system have been caused by damp clay, which packs down as soon as the material moves and causes a fresh "hang-up."

Various other refinements were made in the first six raises, as they were all finished in a desperate hurry with little or no chance to experiment. There were three chutes connecting each drift to each "bull-dozing" chamber or six chutes to each rock raise. The idea was that loading of the train below could continue while the "bull-dozer" was working on any difficulty in the main chute directly below the rock raise. This idea made it necessary to cut out the "bull-dozing" chamber to practically 80 ft. in length and 50 ft. in width. Practical experience soon demonstrated that it was faster to wait on any delays in the main chute, and so auxiliary chutes have been closed, and on No. 7 raise—the newest one—there is only one chute in each drift and the size of the "bull-dozing" chamber was cut down over 40 per cent. Also, the longitudinal distance between raises—along the axis of the loading drifts—was increased from 120 ft. to 240 ft. and later on probably will be extended to 300 ft. It will readily be seen that these changes more than halve the development cost for the future. Also, it allows the work on pits to be carried on with much less interference. As far as possible all classes of material for the raw mix are obtained at the quarry; that is, clean high-grade stone is being handled in one or two raises at the same time that lower-grade material is being handled in some of the other raises. This necessitates that the work going on in the pits must be on different elevations on different raises, so great care must be taken that work high up on one raise does not make it dangerous to work lower down on an adjoining raise. It actually works out that the job must be handled as if there were two or three adjacent quarries.

The limestone lying west of the canyon is overlaid by sandstone and shale varying in thickness from 20 to 150 ft. This material must be stripped and is disposed of by dumping it down on the floor of the old quarry. The work is done by a crawler-type steam-shovel, steam "dinkies," and 4-cu. yd. Western dump cars, all machinery having been brought up from the operations of the old quarry. The stripping is intermittent, only enough being done at one time to insure a wide safe bench above the operation of the glory holes below. For the life of the deposit about 1 ton of waste must be handled for 30 tons of limestone worked out below.

The actual breaking of the rock is done on the sides of the canyon—so far only the west side. Operations start by drilling and blasting around the mouth of a rock raise, the drillers backing up hill for each successive slice. When the drilling and blasting reach the top of the limestone—the stripping level—the same crew, augmented, starts to clean down the bank with bars, picks and shovels, and occasional blasts. The rock wall above them must be left in as nearly a perfectly safe condition as possible, or as they know how to make it, before another slice is started at the bottom. Drilling is done with a light hand-held sinker—at present the Ingersoll-Rand S-49—all holes being vertical. There



AN airplane view of the plant with Santa Cruz mountains in background is shown above. *Right*—Tunnel entrance with sides of glory-holes in background. *Below*—No. 1 and No. 2 rock raises with No. 3 raise visible in rear.

are seven steels to the set, beginning with 3 ft., each change 3 ft. longer, and ending with a 21-ft. drill. A double-taper cross-bit is used, the gage starting with 2¼ in. and ending with 1⅜ in. The drilling is dry, that is, the drillings are cleaned out of the hole by compressed air.

As soon as the drilling on a bank is completed, the powder-men move in, and first load the holes with a springing charge, which will average 6 sticks of 1-in. by 8-in. 60-per cent. ammonia dynamite. The drillers then clean out the holes with blow-pipes and the powdermen load them to within 2 or 3 ft. of the top with Hercules E. P. No. 23—a free-flowing bulk powder. Instantaneous electric caps with 24-ft. leads are used in series, and blasting is done with a regular magneto machine. Then both drillers and powdermen return to the bank and carefully bar down before proceeding to the broken rock in the cone to block-hole everything in sight that may be large enough to cause trouble in passing through the raise or chutes. Blasting on the block-holing is done with fuse and caps and 1-in. by 8-in. sticks of 40-per cent. nitroglycerin.

The limestone, due to its purity and semi-metamorphosed condition, has always broken coarsely, regardless of the number and spacing of the holes and the quality and quantity of explosive used. In certain parts of the deposit it is not uncommon to blockhole 600 boulders in a blast containing about 3,000 tons. Naturally, the greater the care and the attention in block-holing on the surface, the fewer will be the delays and the greater the tonnage loaded in the tunnel.

The following figures on the production of 1930 may be of interest:

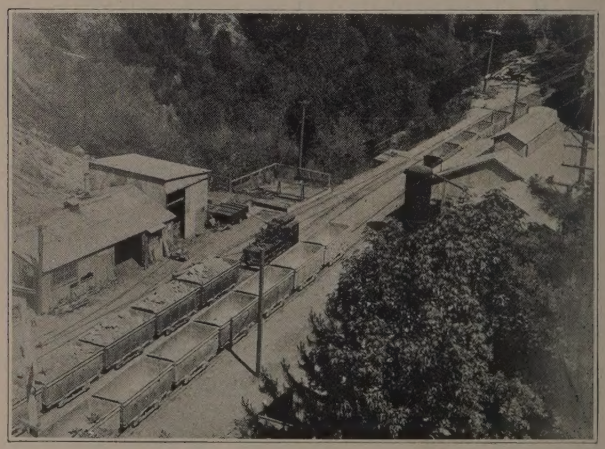
Material loaded	430,378	tons
Number of machine-drill shifts	801	
Number of holes drilled	3,306	
Amount of hole drilled	60,324	ft.
Material broken per machine-drill shift	537.30	tons
Material broken per hole	130.18	tons
Material broken per ft. drilled	7.1	tons
Primary explosives used (including springing)	92,500	lb.
Average weight of explosive per hole	27.97	lb.
Secondary explosives used	15,850	lb.
Material broken by 1 lb. of primary explosive	4.75	tons
Material broken by 1 lb. of secondary explosive	27.13	tons
Total amount of explosives used per ton of rock	0.25	lb.

(NOTE: The figure of 4 tons of stone per lb. of explosive does not seem high compared to other types of quarry operation, but it must be remembered that it includes both primary and secondary blasting and that no mechanical handling of the materials is necessary to load them into cars for the plant.)

More so than is usually the case in quarrying operations, the breaking and preparation of the rock in the pits and the loading and transportation of the rock in the tunnel are widely separated.

Air-operated gate used for controlling rock feed to cars in tunnel.

There are three tracks in the yard at the mouth of the tunnel. On the center one the loaded cars from the tunnel are delivered ready for the trolley locomotive and transportation to the plant. On the west track the trolley locomotive delivers the "empties," while the east track is a house and supply track. All haulage in the tunnel is done by three 6-ton storage-battery locomotives equipped with Exide Ironclad cells. One of these locomotives handles 8 cars at a time with a grade of 0.72 per cent. in favor of the loads. A loading crew consists of 4 men—a motorman, two loaders, and a "bull-dozer" who works in the chamber above the chute. The head-loader rides the trains as a brakeman, while the other loader cleans up the spillage between trains, or helps the "bull-dozer." If the "bull-dozer" needs assistance while loading is going on, the motorman goes up to help him.



Looking down on entrance to tunnel showing locomotive and train of loaded cars. Compressor-house at right.

The dimensions of the chute are controlled by the fact that the cars dump directly into the No. 18 crusher at the plant. The width inside the chute is 60 in. with a maximum 32-in. opening of the check-gate. The floor of the chute is built on a 37-deg. pitch. The underswung arc gate is controlled by

(Continued on page 21)

Industry to Benefit Indirectly Through Reconstruction Finance Loans

Washington Correspondent Tells Purposes and Functions of New Credit Corporation

NOW that the Reconstruction Finance Corp. is functioning and actually lending money which, its sponsors hope, will aid materially in the revival of industry and trade of all kinds, many in the quarry industry and the building industry doubtless are wondering just how it will help them. This wonder, in fact, is not confined to those two industries. It is general. This is shown by the number of inquiries which are coming to the corporation's office in Washington and to the offices of congressmen and senators.

The corporation's purposes and functions, it is plain, are not generally understood among the business men of America, though all are hoping it will benefit them in some way. It is not surprising there is misunderstanding concerning the corporation. There is no secret that more than one member of Congress who voted for the bill did not understand it, having only a vague idea that it would do something for business.

The bill was rushed through Congress in record time. Its provisions could not be explained in detail in the daily press, chiefly for lack of space. Consequently, there has been no place for the ordinary business man to turn to ascertain what effect the act would have on him. It is the purpose of this article to explain, as simply as possible, just what the corporation is and what it can do.

Probably one of the most misunderstood features of the corporation is the type of business to which it can lend money. Members of the quarry or building industries who have hoped that in some way they could obtain loans from the corporation must disabuse themselves of that hope immediately. It is true the corporation was created primarily to aid business through lending money. However, the corporation has no power to lend money directly to industry; it must lend only to banks and similar institutions which, in turn, are supposed to be able to "loosen up" to industry by reason of greater liquidity of their resources.

Probably the title of the Reconstruction Finance Corp. Act, which states it is to "provide emergency facilities for financial institutions, to aid in financing agriculture, commerce and industry," have misled some business men. What the title does not make clear—though the act itself does, beyond a doubt—is that the aid is indirect.

The act provides specifically that loans may be made by the corporation only to banks, savings banks, trust companies, building-and-loan associations, insurance companies, mortgage-loan companies, federal land banks, joint-stock land banks, federal intermediate credit banks, credit unions, agricultural credit corporations, and livestock credit corporations.

It is especially important that business men who have been expecting direct aid from the corporation study the foregoing list. Unless their organizations come within one of the categories mentioned they simply can not obtain any money from the corporation, because the law will not permit loans to them.

It is the hope of President Hoover and General Dawes that the Reconstruction Finance Corp. Act will materially benefit the building industry, which has been hard pressed in many cases by its inability to obtain money from banks with which to finance construction projects. The president has repeatedly expressed his concern over the slump in construction, particularly of residences, and has warned that some better methods of financing must be devised. While there is no guarantee that the corporation can aid a building revival, there is every hope that, by the judicious placement of its loans, such a revival will occur. Because of the often-expressed wish of the president that some definite efforts be made to enable builders to build, there seems little doubt that General Dawes, in placing loans, will bear in mind the importance to the country of an easing of the tension in the building industry. Any revival of this sort naturally will be felt in the mineral industries.

The important thing to be borne in mind by business men in considering the possible effect on them of the Reconstruction Finance Corp. is that they are expected to look first to their own banks, which, in turn, are expected to come to the corporation for assistance if they have difficulty in discounting the obligations of the business men.

Another matter of great interest is that of the $500,000,000 appropriated by Congress for the corporation, $200,000,000 may be used for the relief of banks that are closed or in the process of liquidation. This should help to restore confidence to many localities of the United States. Loans of this nature must be secured by the assets of the closed bank and may be made, in the discretion of the corporation, upon application of the receiver or liquidation agent of the bank. Receivers of national banks are authorized by the act to contract for such loans and to pledge the assets of the bank for securing them.

In addition to aiding banks that are closed or in process of liquidation the corporation is authorized to extend similar aid to trust companies, building-and-loan associations, insurance companies, mortgage-loan companies, credit unions, federal land banks, joint-stock land banks, federal intermediate credit banks, agricultural credit corporations, or livestock credit corporations.

Loans to institutions or organizations mentioned,

whether they are going or insolvent concerns, may be made for such periods as the corporation may approve, but not exceeding 3 yr. The corporation, however, is permitted to extend the time, with an absolute limit of 5 yr. from the day on which the loan was originally made.

The act provides that all loans made by the corporation must be "fully and adequately secured," and the corporation is authorized to take over or provide for the administration and liquidation of any collateral accepted by it as security for loans.

Loans may be made directly upon promissory notes of the borrower or by way of discount or rediscount of obligations tendered for the purpose, in such manner as to impose upon the borrower an unconditional obligation to repay such loans in accordance with their terms. In other words, the corporation seeks to impress on the public the fact that the money is being lent and not given away; that it must be repaid.

The act imposes three important conditions under which loans may be made:

1. No loans or advances may be made upon foreign securities or foreign acceptances as collateral or for the purpose of assisting in the carrying or liquidation of such foreign securities or foreign acceptances.

2. No loan may be made for initiating, setting on foot, or financing any enterprise not initiated, set on foot, or undertaken prior to Jan. 22, 1932. This limitation, however, does not apply to loans made to agricultural or livestock credit corporations or federal land banks, joint-stock land banks, or federal intermediate credit banks, nor to loans made to banks for financing agricultural operations.

3. All borrowers must consent to such examinations of their books and records as the corporation may require. In addition they must submit to the corporation on request any reports of examinations made by "constituted authorities" such as bank examiners.

There is a considerable amount of red tape required before applications for loans can be acted on by the corporation. It is important that the regulations issued by the corporation be studied before application is made, because applications not in proper form simply will be delayed.

Before an application will be received by the corporation, the applicant's board of directors must adopt a resolution authorizing the application. In addition, the application, exhibits and collateral for the loan must be submitted to the applicant's counsel and his opinion obtained and set down on a form prepared by the corporation.

Application forms now are available to the corporation's office in Washington or at any federal-reserve bank or branch. Applications for loans must be made on the prescribed forms and all information required must be given.

Sufficient information should be submitted with the application to enable the corporation to determine promptly the financial condition of the applicant, and the reasonable value of the security offered. Such information should include financial statements of the makers of collateral notes, or true copies of such statements and "appropriate" data on mortgages and unlisted securities, including copies of recent appraisals covering real estate securing mortgage loans.

It is pointed out that collateral listed in the application must be considered and valued by the officers of the corporation authorized to execute the application. False statements and overvaluation of any security offered subject the applicant's officers to fine or imprisonment.

Such applicants as are not subject to supervision and examination by federal authority will be required to submit copies of the latest report of examination by state authorities, if subject to state supervision. If not subject to state supervision, they must submit the latest available audit.

Three copies of the application and exhibits must be filed with the corporation or its nearest loan agency (usually a federal-reserve bank or branch). If the loan agency thinks it advisable, it may require whatever additional information it feels should be transmitted with the application. While the loan agencies will send along a recommendation with the applications and exhibits, the final determination as to granting of loans will rest with officers of the corporation in Washington.

The corporation itself will notify the applicant of the action taken on its application. If it is approved, the corporation will make the proceeds of the loan available through the federal-reserve bank or branch of the district in which the applicant is located, upon the deposit of the applicant's obligation and the collateral. The collateral must be properly indorsed or assigned and mortgages must be accompanied by title papers and executed assignments to the corporation in form for recording.

The only other type of loans which the corporation is empowered to make is that to railroads. Loans may be made to railroads only upon approval of the Interstate Commerce Commission and when, in the opinion of the board of directors of the railroad, the carrier is unable to obtain funds on reasonable terms through banking channels or from the general public.

The Reconstruction Finance Corp. Act provides that loans may be made by the corporation only for one year after approval of the law (January 22, 1932), but the president is empowered to extend for one additional year the time within which loans may be made.

Stressing the temporary character of the corporation and the fact that it is only designed for use in the present emergency, it is important to note that the law provides that upon the expiration of the 1-yr. period within which loans may be made (or upon expiration of the additional year, if extended by the president) the corporation shall proceed to liquidate its assets and wind up its affairs. This does not mean, of course, that it will call loans it has made which run for a longer period of time.

Nor does it mean that the corporation must wind up its affairs at once, for the law specifically provides that it may remain in existence for 10 yr.

It must, however, start to liquidate its affairs within one or two years, as the case may be. If the liquidation has not been completed within 10 yr. from January, 1932, the law provides that the affairs of the corporation shall be taken over by the secretary of the treasury.

Under the law the corporation must make a quarterly report of its operations to Congress, which shall give the aggregate loans made to each of the classes of borrowers and the number of borrowers by states in each class. The statements also must show the assets and liabilities of the corporation. The first report will be made April 1, 1932. The names of firms applying for or granted applications will not be made public.

The law provides severe penalties for making false statements to the corporation, for defrauding, embezzlement, or other offenses which might be perpetrated. It also prohibits the use by any individual, association, partnership or corporation of the words "Reconstruction Finance Corp.," or a combination of those words as a name or part of a name under which they might do business. This, of course, is to protect the public from unscrupulous persons who might seek to profit from the reconstruction program by using a name similar to that of the government corporation. A penalty of one year in prison, or a fine of $1,000, or both, is provided for violation of this provision.

In pointing out some of the reasons for passage of the Reconstruction Finance Corp. Act, Representative Henry B. Steagall, of Alabama, chairman of the House committee on banking and currency, said the necessity for relief for agriculture, commerce and industry was "recognized on all hands."

"Agriculture is suffering to a point that has alarmed all students of public affairs," he continued. "The farmers of the country are borne down by the burdens of debt and taxation. Thousands of them face the loss of their homes and complete bankruptcy. Trade and commerce have been curtailed and industry in many instances has collapsed. A prime underlying cause of all this is the disintegration of our banking system."

Congressman Steagall said the banking situation alone presented an emergency that demanded "swift and effective action if relief is to be afforded in time to prevent most serious and far-reaching developments."

"The outstanding difficulty that confronts us springs from the loss of confidence and the general state of fear that has been created," he said. "Meantime, the banks that are members of the federal-reserve system find themselves without such paper to offer for rediscount as the federal-reserve banks will accept. State banks that are members of the federal-reserve system are in the same situation, and state banks that are not members of the federal-reserve system are in the midst of practical difficulties equally unfortunate, if not worse.

"These developments have resulted in tying up deposits in large amounts, destruction of confidence, the breaking down of local credit facilities, widespread depreciation in values and general demoralization of business. This has unquestionably had a part in bringing about the widespread depression from which we are suffering and, regardless of other remedies, we must have an improvement in our banking system before we may expect a return of normal conditions in economic affairs.

"Many of the banks to which reference has been made are entirely solvent but not in position to liquidate their holdings nor to take care of their liability to depositors in the present situation unless something is done to provide accommodations or to relieve the present disturbed state of mind on the part of the public.

"The credit facilities provided in this act, if the measure is administered wisely and well, will unquestionably afford relief to many banks that are worthy of credit, but unable to command necessary accommodations that are afforded in normal times.

"In addition to the relief which is sought to be furnished to other institutions, the bill provides for loans upon the assets of any banks that are closed, insolvent, or in process of liquidation, to aid in the reorganization or liquidation of such banks. It is hoped that this provision will afford some measure of relief to communities that have been deprived of normal banking accommodations and aid such communities in the struggle for economic recovery."

Quarrying by Glory-Hole Method

(*Continued from page 18*)

two double-acting air-cylinders through one 4-way valve operated by a simple system of levers. The check-gate must hold back the rush of rock, which may be very great in the winter after a heavy rainstorm, especially if there is a large proportion of fines in the material. This type of check-gate has not proved wholly satisfactory when handling coarse rock, as its rigidity causes much arching and many delays with sizes of rock that offer no trouble to the crusher. Its greatest value lies in its ability to hold back the rushes of rock and fines in the stormy season. It will eventually be replaced by a heavy swinging check-gate, such as has been experimented with for two years. However, experiment had to demonstrate some safe method of holding the swinging gate rigid against water-soaked material in the winter. This was satisfactorily worked out last winter and, with time, all the rigid type gates will be eventually replaced and an increase in loading speed of from 10 to 15 per cent. will probably result.

During 1931 one loading crew has averaged better than 1,100 tons per shift, and has loaded as much as 1,800 tons of well-prepared rock in one shift. The system was designed for a steady production of 2,000 tons in a single shift, or 3,000 tons on a two-shift basis. However, the loading system has repeatedly reached 2,400 tons in one shift—the limit of crusher capacity—and once 3,800 tons in 16 hr.

In 1930 the duty per man-shift for all breaking, loading, superintendence, repair and shop men, but excluding the five months of stripping, was 44.043 tons, and for the total loading crew in the tunnel 167.21 tons.

The Development of Idaho's Nonmetallic-

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School of Mines,
University of Idaho

THE nonmetallic-mineral resources of Idaho discussed in this paper and named in their apparent order of present importance are phosphate rock, clay, Portland-cement materials, limestone and marble, sandstone, mica, granite, basalt, rock salt, barite, diatomaceous earth, asbestos, and sulphur. Other minerals that have been reported to exist in possible commercial quantities, but that are not discussed here, are bentonite, gypsum, bauxite, feldspar, garnet, magnesite, talc, calcite, and sand and gravel. Of these minor minerals, the two last mentioned are the only ones that have ever received any use and then only locally where needed. The others are either too far from the market or from transportation facilities to have received much attention and for those reasons little is known about them.

In most cases estimates of the reserves can not be made, but those of some of the minerals are known to be so immense as some day, perhaps, to rival in value the state's metallic-mineral resources.

Phosphate Rock

Location.—The general occurrences of phosphate rock[1] of commercial importance are shown roughly on the accompanying map (Fig. 1). The most accessible deposits are in Caribou and Bear Lake Counties.

Nature of Deposits.—The phosphate rock lies in beds dipping from low angles to the vertical and having a thickness of at least 5 ft. with some of them increasing to 7 ft. or more. Both the ore and the inclosing rock are generally soft, although some of the producing beds are quite hard. Part of the rock has an oölitic texture and is black to brown or grayish color. Analyses show from 60 to over 70 per cent. tricalcium phosphate with less than 1 per cent. each of alumina and iron oxide.

Mining and Treatment.—Some work can be done in open pits (Fig. 2), but practically all must be done underground. There the width of the beds allows most of the work to be done within the ore itself. Fig. 3 shows a stope in the Waterloo Mine of the San Francisco Chemical Co. and gives an idea of the thickness of the deposit, which is all taken out.

The Anaconda Copper Mining Co., the largest producer in the region and the only one of importance in Caribou County, has spent over $2,000,000 in developing the mine, mill, townsite, power-lines, and railroad (Fig. 4). The ore is shipped from Conda, the townsite, over the company's railroad to Soda Springs, 9 mi. away. From there it is sent to Montana for acid treatment. Although the phosphate rock can be applied directly to the soil, most of the companies have found it desirable to ship the rock to other places for manufacture into superphosphate. There have been a number of companies operating in Bear Lake County, but the most important one to be organized recently is the Solar Development Co., started in 1930, near Paris. This organization is a subsidiary of the Consolidated Mining & Smelting Co. of Canada, to whose acid plant in Trail, B. C., the ore is shipped for treatment.

Production and Reserves.—According to Stewart Campbell,[2] the total production of phosphate rock in Idaho from 1922 to 1930 was 433,295 tons, valued at $1,857,582. In 1930 the amount was 72,340 tons, valued at $289,360, which has been exceeded only in 1925.

This field is the largest in the United States and one of the three largest in the world. The reserves

Fig. 2. Open pit on the property of the San Francisco Chemical Co. near Montpelier.

Fig. 3. Stope in the company's phosphate-rock operations known as the "Waterloo Mine."

Mineral Resources

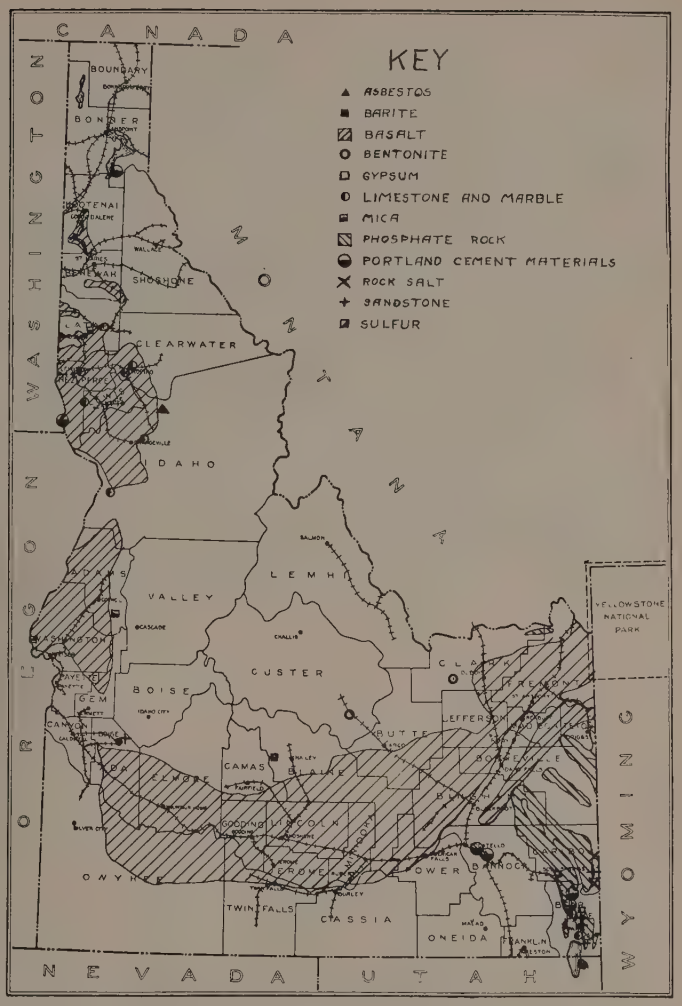


Fig. 1. A geologic map of Idaho showing distribution of the state's nonmetallic mineral resources.

in Idaho have been estimated at 5,000,000,000 tons, an amount that is five-sixths of the total for the Rocky Mountain field.

Clay

Clay is found in a number of counties but in many cases the extensive occurrences are not now of value because of transportation difficulties.[3] Commercially valuable clays are found in Benewah, Kootenai, Latah, and Washington Counties, but those deposits in Latah County are the only ones that have been exploited to any degree.

The clays are of two types, residual and transported, both which have been derived from granitic rocks. For this reason the deposits are in general found near the margin of these rocks.

All the clays are suitable for structural ware and those in Latah County have been made into brick and refractories. With refining, a good grade of china clay can be produced.

Portland Cement

Location.—Portland-cement materials are found in Bannock County, 12 mi. southeast of Pocatello, at Inkom, and along Black Rock Creek about 4 mi. west of Inkom.[4] Another possible source in southern Idaho is the region north of Montpelier, in Bear County.

In northern Idaho a limestone suitable for Portland cement is found on the eastern shore of lake Pend d'Oreille, near Bayview, in Bonner County. Limestone and calcareous shale that outcrop at Lime Point, in Nez Perce County, 30 mi. south of Lewiston, up the Snake River, near the mouth of the Grand Ronde River, form another possible supply of Portland-cement materials.

Nature of Deposits.—At Inkom a talus slope, consisting of a mixture of broken limestone and shale, is the source of the present supply, although bedded deposits of the same rocks form a near hill. The limestone contains less than 2 per cent. magnesia.

Along one side of Black Rock Creek a limestone, containing in most places less than 2 per cent. magnesia, forms a hill about 200 ft. high. Just across the creek is a shale that analyses indicate to be probably suitable for mixing with the limestone to give the right composition for cement. This shale is hard and does not slack readily. Practically no overburden is present on either side of the creek.

The limestone in the region of Montpelier, where it outcrops in Georgetown canyon, 4 mi. northeast of Georgetown, has a composition approximating the mixture necessary for Portland cement. Whether the rock has a uniform composition over its extensive areas of outcrop is not known.

At Lime Point the limestone and calcareous shale are very pure and, judging from random analyses, it is believed they can be combined in a desirable mixture for Portland cement.

Development.—The principal producer of Portland cement in the state is the Idaho Portland Cement Co., whose plant at Inkom has been described.[5] It is located on the Oregon Short Line R. R. and on the main highway across the state. The company controls the near bedded deposit, but is at present quarrying the talus slope with steam shovels. Fuel for burning clinker is powdered soft coal from Utah, although from near parts of southwestern Wyoming coal suitable for such use is also available.

The deposit on Black Rock Creek is about a ½ mi. from the railroad and the outcrops near Montpelier are within 5 mi. of the railroad at Georgetown and within 3 mi. of the railroad at Bennington on the northeast edge of Bear River Valley, but

Fig. 4. A view of the phosphate plant of the Anaconda Copper Co. at Conda.

at none of these places has any effort been made to utilize the deposits.

The largest former operation connected with the Portland-cement industry in Idaho was carried on until 1929 near Bayview at the quarry of the International Portland Cement Co.[2] All the limestone used in the manufacture of cement at the company's plant near Spokane, Washington, came from here.

No work has been done at Lime Point, probably because there is no road or railroad running near the deposit, although water transportation down the Snake River to Lewiston would be possible at any time except during four months of low water in the summer.

Practically limitless reserves are present at all the places mentioned above.

Limestone and Marble

Location.—In southern Idaho commercial limestone and marble occur northeast of Arco in Butte County, at Pebble in Bannock County, and near Montpelier in Bear Lake County. In addition, travertine deposits are found at several places, among which are two deposits in Bear River Valley in the southern part of Caribou County.

In northern Idaho the most important deposits of limestone and marble are in the region about Orofino,[6] in Clearwater County. The rock outcrops in the canyon of the Clearwater River between Jim Ford's Creek, 4 mi. southeast of Orofino, and the village of Ahsahka, 4 mi. northwest of Orofino. Other outcrops are found 5 mi. up Jim Ford's Creek and 11 mi. up Orofino Creek to the east of the town of Orofino. Marble, probably from the same geologic formation, outcrops near Agatha on the Clearwater River, in Nez Perce County.

Limestone or marble of a different formation is found in the region south of Orofino, near Harpster and also near Lucille, in the Salmon River canyon, both in Idaho County. A similar marble, probably of the same formation, occurs along Mission Creek, in Lewis County, near the Nez Perce County line, and also in a gulch about 1 mi. to the west.

Nature of Deposits.—The limestones[1] found in Bannock and Bear Lake Counties are reported as high-calcium, with that in the latter county containing about 93 per cent. $CaCO_3$. This rock outcrops for about 2½ mi. at the eastern edge of Montpelier and also along a 6-mi. strip about 10 mi. south of the town near the northeast corner of Bear Lake. Both deposits form the hillside on the eastern edge of Bear River Valley. The Brazer formation, of which they are a part, outcrops at other points in the surrounding area.

One of the travertine[1] deposits of Caribou County is reported to contain about 92 per cent. $CaCO_3$ and less than 1 per cent. $MgCO_3$. If this is characteristic of all the deposits, they would furnish a large source of high-grade lime.

The limestone beds near Orofino are three in number and of a lenticular shape, with thicknesses varying from 10 ft. to over 800 ft. They are in reality marble, and are inclosed in quartzites, schists, and gneisses that have been exposed where the streams have cut down through the basalt into the ancient metamorphic rocks.

Near Agatha the marble is of excellent grade and quality, but in the canyon of the Clearwater near Orofino there are some impurities. Granitic dikes form the major impurity, while pyrite, graphite, and magnesia are present in minor amounts. Magnesia is present in larger amounts northwest of Orofino than it is in the direction of Jim Ford's Creek. The same is true of the granitic dikes, and southeast of Orofino these are more abundant in the two lower beds than in the upper one. In some cases they render the limestone

valueless. The upper bed at the quarry of the Clearwater Lime Products Co., 2½ mi. southeast of Orofino, is 800 ft. thick and extends for more than ¼ mi. along the strike. The rock is white and the content of $CaCO_3$ ranges from about 90 per cent. to over 98 per cent., with a large part of it running about 95 per cent., while the magnesia content is less than 1 per cent.

At the quarry site of the Sewell Lime Co. the outcrop is about 600 ft. thick. The marble is coarsely crystalline and most of it is white in color with some gray in places where the rock carries magnesia. Other minor impurities are graphite and talc. Granitic seams are absent and the white part of the marble is exceptionally pure.

The limestone in Idaho County is about 200 ft. thick, although near Switchback, east of Harpster, its thickness has decreased to 60 ft. It has a mottled dark bluish-gray color, with some white streaks. Its analysis is similar to that of the marble at Orofino and shows about 95 per cent. $CaCO_3$ with less than 1 per cent. $MgCO_3$.

Along Mission Creek the marble is exposed for about 300 ft. in the steep canyon wall, to a height of about 500 ft. It has an analysis similar to the rock near Harpster and is said to show a wide variety of colors, shades, and patterns, but the dominant color is a dark bluish-gray.

Development.—In 1923 the quarries at Arco[2] were the largest in the state, but in 1924 operations were stopped.

In Bear Lake County the beds at the eastern edge of Montpelier are more favorably located than those farther south, since the Oregon Short Line Ry. runs through the town. Here a kiln was operated over about a 5-yr. period, ending in 1913, and since then the quarry has been practically idle.

Of the travertine deposits mentioned, the two in Bear River valley are accessible to the railroad.

In northern Idaho the deposits that have received the most attention are those in the canyon of the Clearwater near Orofino. The upper bed at the quarry of the Clearwater Lime Products Co. (see Fig. 5) is the latest one to be developed in this canyon. Work was started in 1927 and a substantial tonnage was taken out in the period from 1928 to 1930. This enterprise has been described.[7] Development at the quarry of the Sewell Lime Co. on Orofino Creek has taken most of the time since 1930, when it was started, so that as yet little tonnage has been marketed. The railway runs near the plants of both companies. A road runs near the beds where they outcrop up Jim Ford's Creek, 5 mi. from the railroad.

There are several quarry sites north of Orofino, but quarrying there is more expensive because of the numerous granitic dikes which in many cases necessitate hand sorting.

The Harpster deposit has been quarried near Switchback and below Mt. Idaho in the canyon of the South Fork of the Clearwater. Both Harpster and Lucille are far from the railroad.

Uses.—At Arco the limestone is of high quality and has been used in the refining of sugar. Finishing tests have been made on the marble of this region and it is reported to be of exceptional quality and colors, but no serious attempt has been made to use it for building stone.

At both Pebble and Montpelier the stone has been burned to lime and at the first-mentioned place a small amount has been sold to sugar factories.

All the limestones mentioned as occurring in northern Idaho are similar to each other in composition and might find like uses. These would include poultry grits, cement, lime, sugar refining, and the manufacture of explosives and of paper. The rock at Orofino can be given a high polish and could be used for building and monumental stone where the granitic seams allow blocks of sufficient size to be broken out. The limestone from Harpster, Lucille and Agatha is probably undesirable for building stone because of its color. It has been burned to lime for local use and is said to have yielded a good product.

No estimates of reserves have ever been made, but they are undoubtedly large.

According to Campbell's figures,[2] the total production of limestone for the period from 1922 to 1930 has been 578,352 tons, valued at $1,006,657.50.

Sandstone

Location.—The sandstone that has received most attention is found in Ada County, about 3 mi. northeast of Boise.[2] In southeastern Idaho[1] the nugget formation furnishes sandstone in Bear Lake and Caribou Counties. One prospect is in Bear Lake County, 5 mi. southeast of Dingle near the head of Pin Springs gulch, and another prospect is in Caribou County, in Poison Canyon, about 2 mi. from the Wyoming state line.

Nature of Deposits.—At Boise the quarry is located about 1,000 ft. above the valley. The rock is of three colors, light gray, buff, and variegated between the first two colors. It is free from oxidation, unaffected by weathering, is easily and rapidly worked, and retains sharp edges indefinitely. The stone breaks out in large seamless blocks with few joint planes. It is very resistant to heat and has a high crushing strength, although it is quite porous.

The sandstone in Bear Lake and Caribou Counties is nearly all of a light reddish-brown color, with some of it a creamy-white. It is fine and even-grained and has a high crushing strength and a low porosity that make it compare favorably with many stones of the East. It is practically a quartzite and may be difficult to work. Fairly uniform characteristics are found where the rock outcrops in the surrounding areas.

Development and Uses.—At Boise the sandstone is taken by surface tram from the quarry to the well-equipped mill of the Boise Stone Co. in the valley below. Rock from here has been used extensively in Boise and can be found in many large buildings throughout the United States.

The stone in the southeastern part of the state has been used but slightly and blocks from only the

talus slopes have been taken out. The scarcity of this color of rock in the Northwest may make it more valuable. The outcrop in Poison Canyon is some distance from the railroad and could be used only locally until transportation facilities are better, but in many places near Montpelier the rock is directly accessible to the railroad.

Large reserves of sandstone exist in all the places mentioned.

Mica

Location.—Idaho's principal deposits of muscovite are found from 3 to 6 mi. north of the village of Avon, in Latah County.[8] This mineral is also found on Council Mountain, in Adams County, southeast of Council.

Nature of Deposits.—In Latah County the mica occurs in pegmatite dikes. Muscovite is not everywhere present in commercial quantities in the dikes, which pinch and swell both along the strike and with depth. The mica splits into clear thin sheets, in many cases several inches in diameter.

Beryl is found with the mica in two of the dikes and in one of these has been estimated to form 2 per cent. of the rock.

Considerable prospecting has been done at Council Mountain and is reported to have revealed mica in commercial quantities. The muscovite splits into clear thin sheets up to 3 in. in size after trimming.

Development and Production.—A railroad passes through Avon and a wagon road leads from there to the near deposits. The various dikes of this region have been opened by a number of open cuts, tunnels, and stopes, but most of these workings are now caved. At present some development work is being done by the Muscovite Mica Co. at one of the properties.

Mica valued at about $100,000 has been taken from the region and extensive reserves yet remain.

Granite

Location and Development.—All central Idaho is underlain by a granitic intrusion, but most of this region is sparsely settled and no use is made of the rock. However, the outlying parts of this intrusion extend into more thickly settled regions where the rock has been utilized to a slight extent.

Some granite has been quarried along Snake River, 36 mi. south of Lewiston, and transportation by boat is available between these points. The quarry is located on a mountain side near Corrale Creek and about ¼ mi. from the river.

A different type of granite occurs near Kippen and on Mission Creek, where it cuts through Craig Mountain. Both places are in Nez Perce County. This rock is also found in the canyon of the Clearwater River between Orofino and Kamiah.

Nature and Uses.—Aside from road-construction work the rock has received little use, probably because of the lack of a near market. Undoubtedly occurrences of the rock suitable for building stone can be found.

At the quarry on the Snake River the rock is fine-grained, has a gray color, and is said to resemble that from Barre, Vt. It has been used locally for monumental stone at Lewiston.

The granite on Mission Creek is coarse-grained and is everywhere cut with joints and veins, but is however, suitable for rough masonry.

Fig. 6 shows a granite quarry for road materials 6 mi. north of Moscow, in Latah County.

Basalt

As seen on the accompanying map (Fig. 1), thick basalt flows, the outlines of which as shown are very generalized, cover a large part of the state.

On any hillside where the basalt outcrops, almost any desired amount of rock can be taken out without going below the level of the valley bottom and in most places the overburden is not a serious problem. The basalt is characteristically dense and difficult to drill, but abundant columnar jointing planes greatly simplify the task (Fig. 7).

Basalt has been used for building stone in the more inconspicuous parts of many buildings. Crushed basalt is used extensively in highway construction.

Rock Salt

Deposits of rock salt[1] occur in Caribou County near the Wyoming state line along Stump, Tygee, and Crow Creeks, about 38 mi. from Montpelier. The salt forms beds near the surface and has also been penetrated at depth by a near oil-well. It is stained reddish-brown with iron oxide, but when the salt is dissolved in water and evaporated it becomes brilliant and pure white. The NaCl content is reported to be about 91 per cent. and the salt in

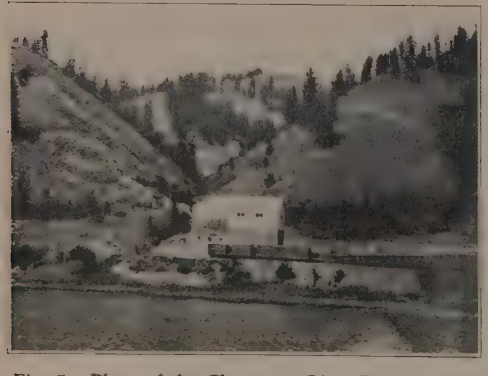


Fig. 5. Plant of the Clearwater Lime Products Co. on deposit near Orofino.

Fig. 6. Granite quarry near Moscow.

Fig. 7. Quarry in basalt near top of Greer-Weippe grade. Note the unusual jointing.

purity is above the average of the commercial grade in the United States. It is used only locally, unrefined for stock and refined for table use. Since 1910 the annual production has been about 40 tons or less, but before the railroad was built as much as 400 tons was produced annually. Salt from these deposits can not compete with that from Utah, even locally, until a railroad is built near.

No estimates of reserves are available except for one of the deposits, for which the figure has been placed at 5,000,000 short tons.

Barite

A deposit of barite occurs on Deer Creek, 9 mi. northwest of Hailey, in Blaine County.[9] It forms a series of white outcrops crossing the ridge between Ajax Creek and the North Fork of Deer Creek about 1,400 ft. above Deer Creek Valley (Fig. 8).

The deposits probably consist of lenticular masses, broken and displaced by earth movements and conformable in trend with the county rock. These lenses vary in width from 50 to 100 ft. and one has a length of over 1,000 ft. The barite is crystalline and white with brownish bands and has few visible impurities, although in places small grains of pyrite have caused iron stain.

The nearest railroad is 8 mi. away, but a wagon road runs to within a short distance of the deposit. Lead-silver ore-bodies occur in the immediate vicinity and a tunnel has been driven to find a continuation both of one of these ore bodies and of the barite, which is exposed for a thickness of about 20 ft. in the tunnel. One car-load of barite is reported to have been shipped in 1922.

The slight amount of prospecting done has revealed a large tonnage, making this the largest known barite deposit west of Mississippi River.

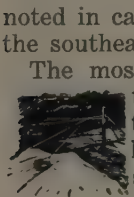
Diatomaceous Earth

Beds of diatomaceous earth cover large areas in the southwestern and west-central portions of the state. Large and promising, but wholly-undeveloped deposits of the material are reported from a number of places along the southwest boundary of the Snake River plains in Owyhee County. Some of these are within easy reach of a railroad line which runs from Caldwell to Murphy.

A small tonnage from Elmore County has been used in the sugar factories of the state.

Asbestos

The most important asbestos deposits in the state are found near the northwest corner of Idaho County.[6] The principal deposit is on a plateau about 14 mi. east of Kamiah and a mile or two south of Glenwood, while other outcrops have been noted in canyons a few miles to the north and to the southeast.



The most abundant mineral is the short-fiber type. The masses of asbestos are lenticular in shape and in a general way follow the surrounding rock in strike and dip. The bodies range from small seams only a few feet wide to large masses with widths up to 80 ft. and lengths as great as 600 ft. More than a dozen ledges exceeding a width of 30 ft. and a length of 100 ft. are found in the region, while others, either smaller or of undetermined extent, are also present. Since the asbestos is resistant to weathering, ledges rising to a height of from 10 to 40 ft. above the surrounding rock, are formed. The depth to which the bodies extend is not known in most cases, but prospecting shows that a few of them pinch out. However, thousands of tons are available without going below the surrounding ground level, since practically the whole mass of the ledges consists of asbestos. The fibers are brittle and can easily be broken into short lengths and split into fine threads. The material is of low tensile strength and is of less value than all but the lowest grade of long-fiber asbestos.

Shingles, mill-boards, plasters, cements, paint filler, insulation materials and bricks are included in the list of uses to which the asbestos from here has been used.

Some development work has been done at the deposits and a mill has been erected at Kamiah, but at present no work is in progress.

Sulphur

Sulphur deposits and sulphur springs are known at a number of places in southeastern Idaho,[1] but one place that may have commercial possibilities is found in Suflur Canyon, 5 mi. east of Soda Springs, in Caribou County. The element occurs as the cementing material of a fault breccia and in the cold springs the water is milky from the presence of free sulphur. The amount of ore available is not known but is apparently not enough to warrant any large-scale development.

Most of the production has been from tunnels and open cuts by which the deposits have been opened. The mineral was melted from the gangue by steam in retorts. A considerable amount was produced in 1901 and 1903 but the project was later abandoned. The decrease in demand for sulphur at the close of the World War brought to an end another development plan that had just been started. It is probable that production could not be maintained at present in competition with other sources.

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The Proposed Sales Tax and How It Will Affect Producers of Materials

PRODUCERS of the raw materials of construction may be faced with the necessity of absorbing or passing on to their customers the amount of the proposed federal sales tax on manufactures. The majority of opinions touching the meaning of the pending bill hold that such materials come within the taxable commodities covered by the bill and, if they are correct, producers must be prepared to meet the charge on all material sold beginning 30 days after the bills signature by the president. In the specific case of the sand-and-gravel industry —and the same conclusion must apply with equal force to the industries producing crushed stone, gypsum, lime, cement, and other nonmetallic minerals—Bureau of Internal Revenue officials, who are already drafting regulations for the administration of the new tax, are of the opinion that producers must prepare themselves unless the bill is amended to provide special exemptions.

Sec. 601 of the tax bill says in part: "In addition to any other tax or duty imposed by law, there shall be imposed a tax of 2¼ per centum of the sale price . . . on the sale of every article sold in the United States by the manufacturer or *producer* thereof . . . " Sec. 617 (e) stipulates that "The term 'manufacture or produce' includes fabricate, cure, tan, dress, dye, bleach, blend, can, mix, spin, weave, refine, and process or manipulate in any manner. . . ." Opinions that the sales tax will apply to the nonmetallic-mineral industries is based upon these provisions.

Proponents of the sales tax frankly acknowledge that it has two virtues so far as the government is concerned: (1) It places on the shoulders of industry the task of collecting and paying the tax; (2) it has the advantage, not offered by increases in corporate and individual income taxes, of providing immediate increases in government revenue. "In respect to the first point, industry might well entertain some serious objections," in the opinion of V. P. Ahearn, executive secretary of the National Sand & Gravel Assn. "Producers will be confronted with the necessity for additional clerical hire to satisfy the book-keeping requirements of the sales-tax feature. To this increase in overhead expense at a time when producers in our industries as well as others are trying to reduce such costs, there must be added a number of other complications."

There are some in Washington who believe that the sales tax will be eliminated from the revenue bill in the house or in the senate. Vigorous opposition to the sales tax has developed, and for a while its enemies were sweeping everything before them, on the ground that the ultimate consumer would pay the whole bill and the manufacturer or producer would escape. A rather dramatic speech by Congressman Huddleston of Alabama has seemed to turn the tide, however, and if a vote were taken in the house, the sales tax would be approved. The Ways and Means Committee is supremely indifferent as to who eventually pays the sales tax, Acting Chairman Crisp stating in the debates that it would be a "fifty-fifty proposition" between the manufacturer or the producer and the consumer; in other words, that in half of the business transactions of the country the manufacturer or producer, due to intense competitive conditions, would absorb the tax.

"If the contractor or the builder could be defined as a 'manufacturer' under the new tax law," says Mr. Ahearn, "the industry would not need to concern itself very much with the sales tax, for the reason that the tax is not imposed upon 'sales by a licensed manufacturer to another licensed manufacturer, or articles for further manufacture.' Our present opinion is that the builder or contractor is the final consumer and, therefore, that the licensed manufacturer or producer selling to him must pay the sales tax. The producer is permitted to pass the tax along to the consumer if, as Mr. Crisp put it, 'he can get away with it.' "

The legislation provides further that the sales tax will not apply to "sales to a state or political subdivision thereof, or any agency thereof, of articles for use solely in the exercise of a governmental function." "The question then immediately arises," adds Mr. Ahearn, "as to whether the sales tax will be collected in the case of materials furnished for highway construction or for federal and state structural projects, like post-offices, schools, court-houses, and the like. If the contractor is an 'agent' of the state or other subdivision of government, then sales of materials of construction would not be subject to the sales tax; if he were not construed to be an agent, then it would seem that the tax could be escaped by having the state purchase the materials and turn them over to the contractor for use. The meaning of the Ways and Means Committee on this particular point is most obscure and it needs clarification.

"Assuming that the sales tax will apply to materials used in highway construction, producers must interest themselves in a determination of whether it will be operative in the case of a contractor who opens his own wayside pit or quarry on the site of the job. It will add measurably to producers' competitive difficulties with temporary operations if they must pay the sales tax while the contractors escape. This particular question will be taken up with the Commissioner of Internal Revenue before he issues his regulations, and our association will contend strongly that, for the government to leave a loophole like this in the law, would not only impose an unfair burden on the established materials industry but would also result in the government losing tax revenue which it would obtain if the material were supplied by the producer with a permanently-located plant and operation."

Sec. 602 (b) (2) provides for an exemption of the sales tax in the case of a manufacturer or producer whose total sales volume during the preceding year was less than $20,000. The meaning of this is clear as far as it goes, but there is no explanation as to how a situation like the following should be handled. An aggregate producer sells material to a concrete-products plant, for instance, whose annual sales are less than $20,000. The operator of the products plant pays no sales tax, but is the material producer compelled to pay the tax on the materials which he supplied? If he does, it then becomes incumbent upon every producer to follow every car-load or truck-load to its point of consumption, to find out for what it is to be used, to determine whether the user has a business whose sales exceed $20,000 yearly and, if they do not, to pay the sales tax himself on the material which he sold. Even if the producer is exempted from the sales tax in these cases, he must still equip himself with information to support the claim for exemption. This is still another phase of the law which will require a fair and intelligent interpretation by the Bureau of Internal Revenue.

The law provides that the sales tax will not apply in "sales by a licensed manufacturer [or producer] to another licensed manufacturer [or producer], of articles for further manufacture." Under this provision, the sale of aggregates by a producer to a ready-mixed-concrete company, as an illustration, whose volume of business is substantially in excess of $20,000 annually, would be sales-tax exempt. The ready-mixed-concrete operator would pay the sales tax on each cubic yard of concrete which he produced, but, so far as concerns the producer who supplied the fine and coarse aggregate, there would be no change in the previous methods of doing business.

Sec. 604 (a) provides that "A transportation, delivery, insurance, installation, or other charge . . . shall be excluded from the sale price [in the calculation of the sales tax] only if the amount thereof is established to the satisfaction of the Commissioner of Internal Revenue, in accordance with the regulations." This provision is of particular interest to producers, since it means that, if the cost of transporting their materials by their own trucks or by their own barges can be established "to the satisfaction" of the commissioner, the sales tax will not be applied to such transportation charges. "To illustrate," says Mr. Ahearn, "in the case of producers whose headquarters are in New York City but whose operations are on Long Island and who transport their material in their own barges to Manhattan Island and other points, they will have to pay the sales tax only on the price at the production point and not at the point of consumption, provided they can convince the commissioner that their cost data with reference to transportation charges are accurate. A great many other producers are affected by this part of the law, and they hardly need to be reminded that it is essential, if they do not already have the information, that their accounting records show in indisputable fashion what their average cost of transportation totals."

It has been said that "protection is afforded manufacturers who contracted for the sale of products at a fixed price prior to March 1." This should not have been accepted to mean that no sales tax would apply on material contracted for before March 1 at a fixed price, and which was delivered after the effective date of the sales tax. Somebody, either the manufacturer or the consumer, must pay the sales tax on all material delivered to the consumer on and after the sales tax becomes operative. The provisions of the law which embrace this feature read as follows:

"Sec. 610. If a manufacturer or producer required to be licensed under this title has, prior to March 1, 1932, made a contract with any other person for the sale, on or after the effective date of this title [the sales tax], of an article, which sale is taxable under this title, and such contract does not permit the adding the amount to be paid thereunder, of the whole of the tax imposed by this title, then the vendee [the consumer] shall be liable for so much of the tax imposed by this title as is not added to the contract price, and the vendor [the producer] shall collect such amount from the vendee and account therefor to the United States; or in case of failure or refusal by the vendee to pay such amount to the vendor, the vendor shall report the facts to the commissioner, who shall cause collection of such amount to be made from the vendee."

Stated concisely, if the producer signed a contract before March 1, 1932, for future delivery at a fixed price, he will be required to make an effort to collect the sales tax from the consumer; if his efforts are unsuccessful, no obligation rests upon him to pay the tax but he must communicate the facts to the Commissioner of Internal Revenue. On all contracts signed after March 1, regardless of whether they contained a provision for payment of the sales tax, the producer himself must pay the tax and, presumably at least, pass it along to the consumer.

"There are some pertinent conclusions to be drawn from the proposal for a sales tax," says Mr. Ahearn:

"1. The sales tax will be extremely difficult to administer in the aggregate industry.

"2. The sales tax will have the inevitable result of adding heavily to producers' overhead expenses, for more accounting and more clerical help will be required.

"3. Unless the Commissioner of Internal Revenue considers the case of aggregate producers sympathetically, the established producer, already burdened by high freight rates, will find it even more troublesome to compete with wayside pits operated by contractors.

"4. Any sales tax in an industry of intense competition will constitute an additional cause for demoralization of the price structure. It provides something else to be 'absorbed' and the temptation not to pass it along to the consumer, where it belongs, will be great. Further, we might as well expect that those who use our materials, in the majority of cases, will say that 'congress declared

this to be a manufacturers or producers tax and you, not we, should pay it."

"5. There is the danger that the sales tax will discourage building activities, if the industry were to unite as a unit in passing the tax along to the consumer."

The probable effects of the proposed sales tax on ready-mixed-concrete producers have been studied by the National Ready-Mixed Concrete Assn. and it is the opinion of this organization's executive secretary and income-tax counsel that the tax will impose a severe financial hardship upon the ready-mixed-concrete industry due to disrupting the present competitive situation with concrete mixed on the job. The association's data show that the builder who mixes his concrete on the job would pay a tax of approximately 5 c. per cu. yd. on the ingredients of concrete, based on their wholesale price at the point of origin, while the ready-mixed-concrete operator would pay a sales tax of approximately 13 c. per cu. yd. This inequality in the sales tax arises from the fact that the job-mixer would not pay a sales tax on transportation and labor costs which the ready-mixed-concrete operator must incur.

Sec. 617 (e) of the new tax law defines "manufacturer" in a way clearly to include ready-mixed-concrete producers, but definitely fails to include the term "builder" or "contractor," and it is this definition that gives rise to the discriminatory rates later to be cited. Local inquiries have developed the improbability that the Commissioner of Internal Revenue will include a builder or a contractor as a "manufacturer" subject to the sales tax. This is an important point, since, if the builder or contractor were a manufacturer under the provisions of the law, the ready-mixed-concrete operator would not be confronted with the inequalities to be mentioned.

Sec. 601 (h) deals with the establishment of the manufacturer's price, and it is the association's interpretation of this subsection that, in an industry such as the ready-mixed-concrete, where the bulk of the transactions are on a wholesale basis, wholesale prices will be taken as the base for calculating the sales tax. Under this proposed provision of the law, builders using job-mixed methods will pay a sales tax based upon the wholesale price of the ingredients at the point of origin, but the charge for transportation will not be included in the calculation of the sales tax.

Another provision of Sec. 601, as already stated, is that a licensed manufacturer selling to another licensed manufacturer would not pay tax on the sale of his commodities. The second manufacturer, if he deals directly with the consumer of his product, must of necessity pay a tax based on his plant sales price. In the case of the ready-mixed-concrete producer this would mean that his tax would be based on the cost of the materials at the point of origin, to which must be added all transportation charges, labor costs, plant overhead, profit, etc. This great difference is the basis of the association's claims of inequality.

"In order to present in concise form a definite illustration of how the sales-tax provision would impose a competitive inequality upon the ready-mixed-concrete operator," says Mr. Ahearn, the association's executive secretary, "take a hypothetical cost analysis in which is shown the method of calculating the sales tax that would be employed in the case of the builder using the job-mixed method.

"While concretes of several different mixtures are used, practically all construction work is done with proportions of about 1 part of cement, 2 parts of fine aggregate, and 4 parts of course aggregate (a 1-2-4 mix). The average quantities of materials required to produce 1 cu. yd. of concrete of these proportions are the following:

Cement	1.30 bbl.
Fine aggregate	0.55 tons
Coarse aggregate	1.10 tons

The average plant prices of these materials follow:

Cement	$1.01 per bbl.
Fine aggregate	0.45 per ton
Coarse aggregate	0.85 per ton

Therefore, the wholesale plant cost of materials entering into 1 cu. yd. of concrete would be:

Cement	(1.30×$1.01)	$1.31
Fine aggregate	(0.55× 0.45)	0.25
Coarse aggregate	(1.10× 0.85)	0.94
Total		$2.50

And the tax on 1 cu. yd. of job-mixed concrete would be, therefore, $2.50×0.0225, or 5.62 c.

"The case of the ready-mixed-concrete producer would be as follows: If we estimate the plant price of ready-mixed-concrete at $6 per cu. yd., the sales tax thereon, at the rate of 2¼ per cent., would equal 13½ c. This illustration shows that the ready-mixed-concrete producer would be penalized to the extent of 8 c. on each cubic yard of concrete which he produced in comparison with the sales tax which the job-mixed method would pay. Under these circumstances, the ready-mixed-concrete operator would be compelled to absorb this 8 c. per cu. yd. in order to maintain his competitive relationships with job-mixed concrete. Upon an estimated annual production in the United States of 10,000,000 cu. yd. of ready-mixed concrete, our sales tax bill would amount per year to $1,350,000, $800,000 of which we should be compelled to absorb and would not be able to pass along to the ultimate consumer."

Since it has been stated frequently by the Ways and Means Committee that it is anxious to legislate on the sales tax in such a manner as to impose no special hardships upon any industry, producers are actually expected to communicate to their representatives in congress any instances of discrimination which would result from the tax bill as it now stands. Therefore, it is essential that producers communicate at once, by wire as well as by letter, with their senators and congressmen, bringing to

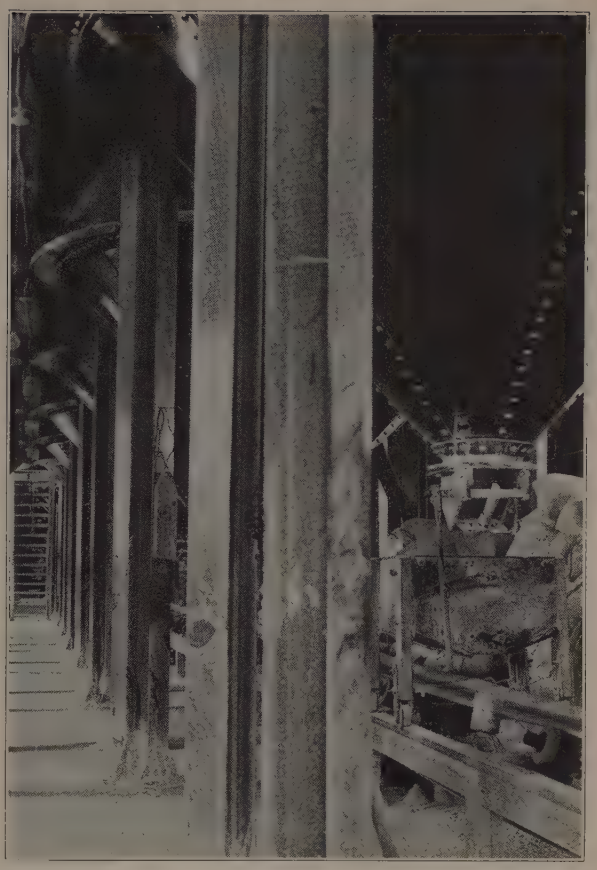
(Continued on page 40)

Rebuilds Feldspar Plant to Insure Uniform Control

By R. CARL MOORE

A GREAT stride forward in the technical control of feldspar was inaugurated by the recent rebuilding and enlarging of the mill of the Erwin Feldspar Co., Erwin, Tenn., a division of the Consolidated Feldspar Corp., and one of a coast-to-coast chain of feldspar mills maintained by the controlling corporation. This mill was rebuilt to insure the success of the Consolidated corporation's special system of uniformity control as applied to feldspars, and into its design was put all the experience gained by the many divisions of the corporation in many years' work in milling feldspar. The size of this mill, in volume of production, is now such that, although it is the only feldspar plant in Tennessee, it places that state second only to North Carolina in the tonnage ground among the twelve states containing feldspar mills.

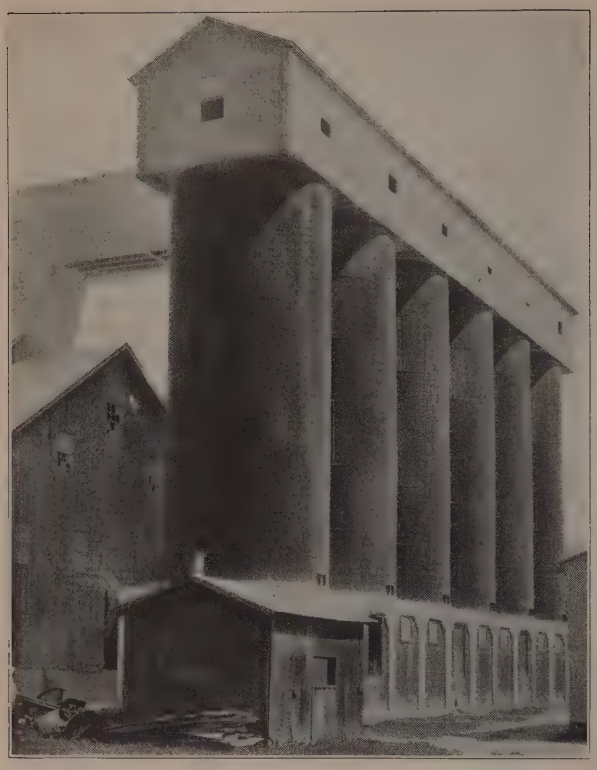
To understand the reason for the special equipment and methods of the Erwin plant, some knowledge of feldspar is necessary. The South produces more than half of the feldspar mined in the country, in grades ranging from high-soda spars used in glazes to high-potash spars suitable for the hardest pottery bodies. It is a well-known fact that different deposits of feldspar may differ from each other not only chemically, but also mineralogically, and to a lesser degree feldspars within the same deposit may show certain variations. As each potter, sanitary-ware manufacturer, or enameler may have his own particular chemical and physical specifications, the necessity of a close check at all times is obvious. The Erwin mill was designed with this end in view.



Bottom view of the silos showing feed to conveyor—one of the improvements toward uniformity control.

The process of uniformity control begins at the mines. The Consolidated Feldspar Corp. operates its own mines in the mountains of North Carolina, and there is located mechanical equipment designed to crush the crude feldspar, wash it, and discharge it on a long and wide conveyor belt, on either side of which are stationed operators to separate the No. 1 and the No. 2 feldspar coming from the same

A view of the storage sheds where crude feldspar is stored.



The finished-material storage-bins.

mine. The separated spar is dropped into chutes located along the conveyor belt, and later loaded into freight cars for shipment to the mill at Erwin, Tenn.

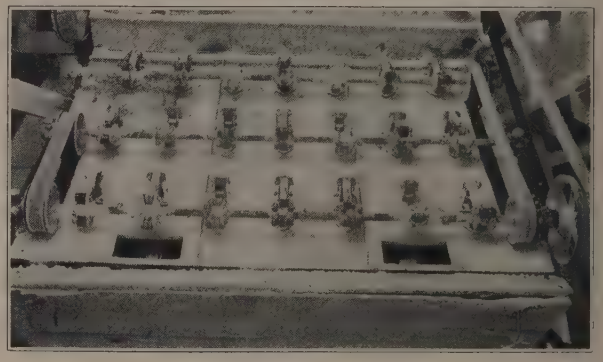
Two side-tracks lead into the mill on different levels. On the upper side-track the box-cars containing the crude ore are "spotted." Here a further selection takes place, and the spar is finally placed in the extensive storage-sheds at the upper side of the mill, separated according to the mine and the grade. From the sheds the ore is conveyed as wanted to the crusher, the mouth of which is on a level with the track. The spar is dumped on a locally-manufactured 4-mesh iron grizzly, from which it is poured into the crusher mouth. The fines passing the grizzly fall through a chute into an inclosed bucket-elevator, and are carried up vertically 25 ft. to a small 8-mesh Rotex screen which eliminates the refuse; the remainder returns through a chute to the crusher mouth. This elevator is driven through the head-pulley by a 50-ft. belt connected to a line-shaft belt driven by a 5-hp. motor, located across the track in the mill. The screen is belt-driven by a 2-hp. motor.

The crusher is a Universal, jaw type, size 15 in. by 30 in., and is belt-driven by a 50-hp. motor. This crusher reduces the ore to approximately 4-mesh. It is the only crusher used, although a smaller Universal is held in reserve. A 10-ton Yale triplex crane, hand-operated, is installed on a runway above the crusher.

From the crusher, a short 24-in. belt-conveyor, driven from the line-shaft before mentioned, takes the discharge to a set of Traylor rolls, which reduce the ore to approximately 8-mesh. These rolls are driven by belts from a line-shaft, in turn belt-driven by a 50-hp. motor. The rolls deliver the crushed spar to a short 16-in. belt-conveyor, at the head of which is a Dings 24-in. by 18-in. magnetic pulley. This conveyor is sprocket-chain-driven from the line-shaft driving the first belt-conveyor, which also drives much other equipment. This belt-conveyor, by a simple board shift, delivers to either of two elevators, each equipped with 7-in. by 10-in. buckets. They are parallel, each driven by sprocket chains from its head-pulleys to the line-shaft, and lead steeply up for 40 ft. from the concrete crushing pit beneath the railroad track. No. 1 elevator is wood incased and kept clean of dust by a Buffalo Forge fan-blower discharging into the air and driven by a sprocket chain from the line-shaft. Elevator No. 2 is open and leads to the drier.

When the spar is damp, elevator No. 2 is used. This discharges directly into a locally-manufactured vertical drier heated by a home-made, coal-burning, fire-brick-and-steel furnace. The drier operates in closed-circuit with Elevator No. 1, returning the dried ore to that elevator by means of a short 16-in. belt-conveyor driven through the head-pulley by the line-shaft driving the other elevators. Elevator No. 1 discharges to a short belt-conveyor driven by sprocket chain from the near line-shaft; at the head of this belt is another Dings magnetic pulley. An automatic sampler, gear-driven from the line-shaft, also operates here. This sampler is of the company's own special design, and at short regular intervals takes small samples of the flow, which are sent to the laboratory.

From the belt-conveyor the spar falls on a reversible shuttle-conveyor operating at right angles to the delivering conveyor. This conveyor is



A view of the hammer screen.

mounted on a locally-manufactured movable steel frame running on tracks; the conveyor itself is 16 in. wide and 125 ft. long, and is belt-driven by a 3-hp. motor. The material flows from either end into chutes, which can be directed to openings in the crushed-material bins located just below. These bins are a very important part of the uniformity control process; they are really silos each 20 ft. in height by 11 ft. in diameter, tapering to cones at the bottom and having 8 in. mouths. They are 30 in number, made of steel fabricated by the Chattanooga Boiler Works, and are spaced in two equal

parallel rows, one on each side of the shuttle-conveyor above. Each holds 80 tons of spar.

Each of these bins is reserved for only a certain kind of spar from a certain mine. When a cross-section of the entire contents of a bin has been taken by the automatic sampler, the sample is quartered, ground, and analyzed. Then, when a customer orders, desiring spar of the same chemical and mineralogical uniformity as before, his desires can be easily and quickly met. Again, if some consumer sends in his specification, having in mind some certain chemical composition, certain fusing characteristics, and a certain type of grinding, the mill is fully equipped to meet these specifications by its uniformity-control methods, which allows the customer to get exactly the feldspar he specifies well within commercial limits.

Shuttle-conveyor and tripper above the crushed-material silos.

Beneath these bins are two parallel stationary conveyors, each with a 16-in. belt. No. 1 is 190 ft. long, and No. 2 is 210 ft. long. Over each are operated several steel boxes with dump bottoms; these run on tracks and are propelled by hand. They receive and measure the flow from the bin-gates to the belts. Each holds 440 lb. of spar. Conveyor No. 1 delivers its load to a short cross 16-in. belt-conveyor, which delivers it to conveyor No. 2. All three conveyors are driven by a cross gear, belt-connected to a 5-hp. motor, which also belt-drives a small Universal crusher used for crushing small sample shipments. At the end of conveyor No. 2 is a third Dings magnetic pulley. On the same platform with the motor driving these conveyors is a 5-hp. motor driving the Tyler generator working Hum-mer screens farther on in the mill. There is also another 5-hp. motor belt-driving a G. E. 11-kw. generator which supplies power for all the other magnetic equipment of the mill.

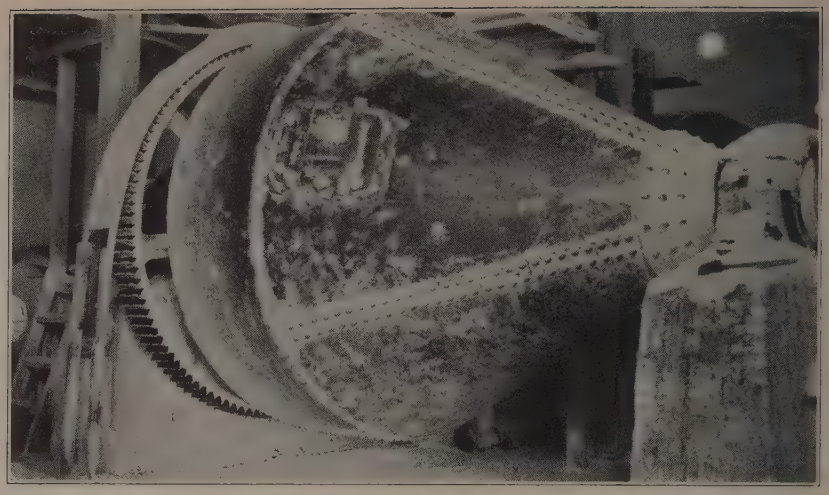
From No. 2 conveyor the feldspar passes through a chute into a 16-in. bucket-elevator having buckets 12 in. wide. By this it is elevated 50 ft. to a point above the tops of four wooden bins, each holding 60 tons. From the elevator the flow passes through a movable chute to one of four chutes leading to the bins. This elevator is driven by a 10-hp. motor, connected by a Palmer-Bee No. 30 speed-reducer, and is wood-inclosed.

Automatic feeders bring the feldspar from the bins to chutes leading to the various mills. The feeders are sprocket-chain-driven from a line-shaft which in turn is sprocket-chain-connected to another line-shaft centrally located and driven by a 25-hp. motor. Bin No. 1 delivers to a 10-ft. by 36-in. Hardinge mill, belt-driven by a 150-hp. motor. Bin No. 2 delivers to an 8-ft. by 30-in. Hardinge mill, belt-driven by a 50-hp. motor. Bin No. 3 discharges to an 8-ft. by 48-in. Hardinge mill, belt-driven by a 100-hp. motor. Bin No. 4 feeds two twin 8-ft. by 30-in. Hardinge mills, both belt-driven, one by a 75-hp. motor, the other by a 100-hp. motor. The flow to either of these twin mills can be split to the proportion desired.

From this point the flow from the different mills is much the same, and that from the twin mills can be taken as an example. The twin-mill discharge flows through chutes to a 10-in. bucket-elevator 30 ft. long, belt-driven from the central line-shaft, and is discharged to a Sturtevant hammer screen, 6 ft. by 8 ft., belt-operated from the central line-shaft. The fines go by chute to another 10-in. bucket-elevator which is 35 ft. long, and sprocket-chain-driven from the central line-shaft. This elevator discharges to the air-separators, of which there are three, two 14-ft. Gaycos, and one 14-ft.

The tube-mill where tailings are ground.

Large conical mill.



One of the smaller conical mills.

Sturtevant. The tailings from the screen go back by chute to the twin mills, the return flow being split by a board. The tailings from the separators go to an Allis-Chalmers 5½-ft. by 22-ft. tube-mill; any excess goes back by a long chute to the twin mills. The tube-mill is belt-driven by a 150-hp. motor, and discharges into a 10-in. bucket-elevator, 35 ft. long, leading to the air-separators. The fines passing the air-separators go to a 10-in. bucket-elevator, 75 ft. long, run by sprocket chain from the central line-shaft. This discharges to a 16-in. belt-conveyor, 30 ft. long, run by sprocket chain from the head-pulley of the bucket-elevator, which in turn delivers to a shuttle-conveyor above the finished-spar loading-bins.

The twin-mill discharge is also run over a special magnetic field, consisting of magnetic blocks which charge copper plates at the bottoms of the chutes leading from the mills. The 8-ft. by 48-in. mill is similarly equipped.

The flow from the other mills is similar in general principle to that from the twin mills. There is another Sturtevant screen and one Hum-mer screen also in use. By a simple system of conveyors the flow is arranged so that the discharge from all the mills passing the air-separators is taken by two belt-conveyors to the room containing the shuttle-conveyor above the loading-bins.

The arrangement of the plant is flexible; if the material desired is below 90-mesh, the air-separators need not be used, and the spar can be sent directly to the cars or to the bagger. From the screens chutes deliver the spar, if desired, directly to a 12-in. belt-conveyor, 25 ft. long and belt-driven from the central line shaft, which takes the spar to the bagger or to a chute leading to the car. The Erwin plant's operations are almost entirely confined to fine grinding; a smaller plant of the Consolidated Feldspar Corporation, at Spruce Pine, North Carolina, does most of the grinding for the glass trade, which usually requires below 90-mesh material.

The two conveyor belts entering the room above the loading-bins discharge either to chutes leading to the finished-material bins beneath or to a 16-in. reversible shuttle-conveyor driven by a 1-hp. motor through a Palmer-Bee speed-reducer. Below the shuttle-conveyor are six bins, locally manufactured, of steel, each 16 ft. in diameter and 42 ft. in height above the concrete bases. Gates at the bottoms of the bins allow bagging either by hand or by a Bates valve-bagger if the spar is packed in paper bags. Most of it is loaded through chutes leading from the bins directly into cars "spotted" on the lower side track. The bins hold 300 tons each.

The rubber belting used in the plant is of Goodyear, Goodrich and U. S. manufacture. The elevating equipment was built by Jeffrey and by Caldwell. The motors are General Electric and Westinghouse.

A machine-shop is maintained by the plant, as well as a completely-equipped laboratory. A small Gardner air-compressor, belt-driven by a G. E. motor, is used to blow the motors. Power is purchased.

Among the best-known of the mines worked by the Consolidated Feldspar Corp. in North Carolina from which the mill secures its crude ore, are the McKinney, the Hoot Owl, the English Knob, and the Glenn.

The head office of the Consolidated Feldspar Corp. is in Trenton, N. J. H. P. Margerum is president; R. W. Lawson, vice-president and general manager; V. V. Kelsey, vice-president and sales manager. The Erwin plant officers are D. J. Grason, Supt., and E. W. Koenig, chief chemist. The rebuilding of the plant was in charge of H. A. Womack, chief engineer of the Consolidated corporation.

Many state legislatures are proposing diversion of gasoline taxes for purposes other than road building. Oppose this proposal! Wire your state representative at once!

Fig. 1. The strand as it leaves the cut.

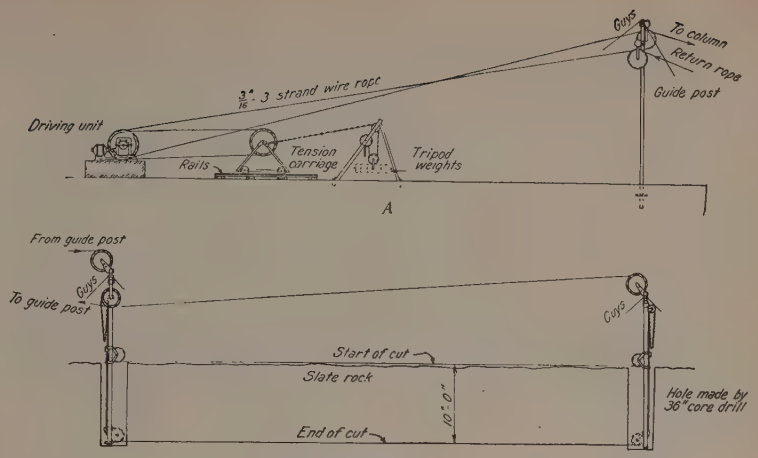


Fig. 2. A typical equipment lay-out: A, driving end; B, cutting end.

Correct Methods of Splicing Wire Saws in Slate and Marble Quarrying*

EVERYONE who visits the slate districts is impressed with the magnitude of the accumulated mountains of waste. Investigators estimate that 70 to 90 per cent. of the gross production is thrown away. The utilization of this waste has long been a problem as slate, unlike limestone which finds many uses in the chemical industry, is chemically inert and its uses are limited. While slate in granulated and pulverized forms is used in many products, the consumption of this waste in comparison with the enormous supply is very small.

This problem of waste in the industry resolved itself into one of prevention rather than utilization. From a study of prevention in production methods came the more economical and modern quarrying practice of wire sawing in place of blasting and channelling in separating the blocks from the solid ledge masses in sizes that may be conveniently removed from the quarry.

In the slate industry in America the wire-sawing method was adopted in 1927 and is extensively used. In the marble industry, however, this method has been used in milling and finishing plants for the past twelve to fifteen years, but its practical application in the quarries has been more recent even than its application in the slate industry. In the marble industry this same problem of waste is also a vital one with an estimation of 20 per cent. of the operator's product finally being placed into buildings.

Figs. 1 and 2, from Technical Paper 469 of the U. S. Bureau of Mines, picture the use of the wire strand in the slate industry. The wire saw as pictured in Fig. 1 is sometimes referred to as a 3-strand wire cable, whereas in reality it is one strand composed of 3 wires. This strand is the saw blade and the teeth are the grains of sand carried in the helical grooves formed by laying the wires into a strand. The simplicity of the entire equipment is suggested by Fig. 2.

The wire-sawing strand in this equipment is a very vital element and the correct splicing of which is of great importance, if economy of operation is to be a factor. In Figs. 3 to 6 is presented a method of splicing which is the result of practical experience and knowledge in wire manufacture and fabrication as well as actual quarry practice.

Cut the ends of the wires as shown in Fig. 3, be-

* Reprinted from *Wire Engineering*.

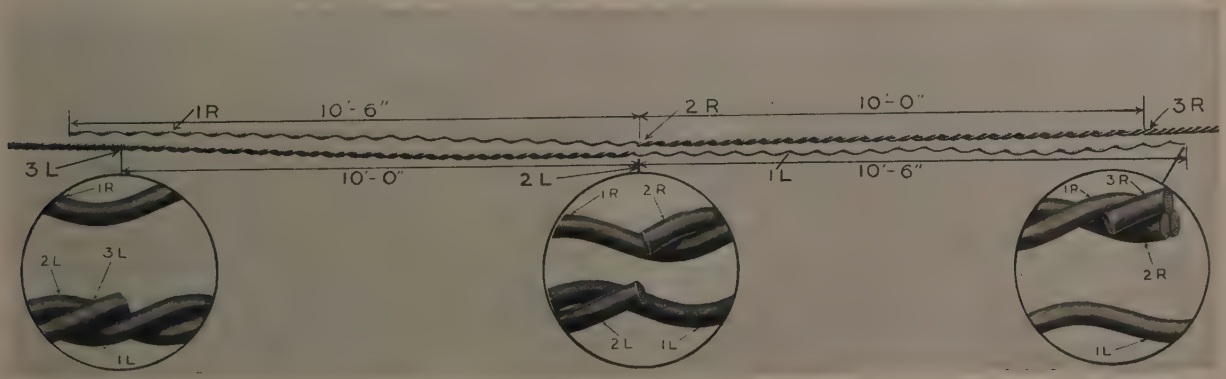


Fig. 3.

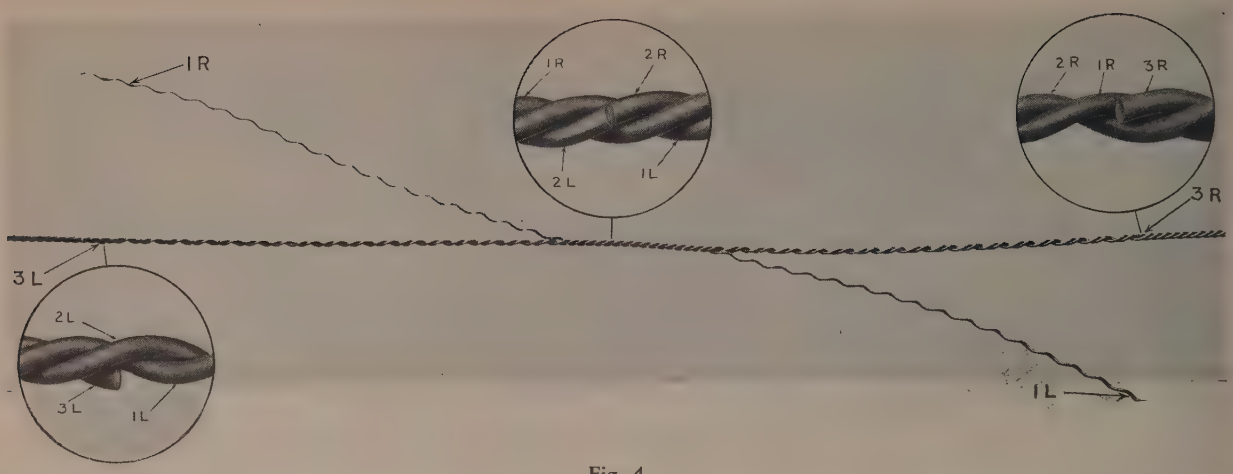


Fig. 4.

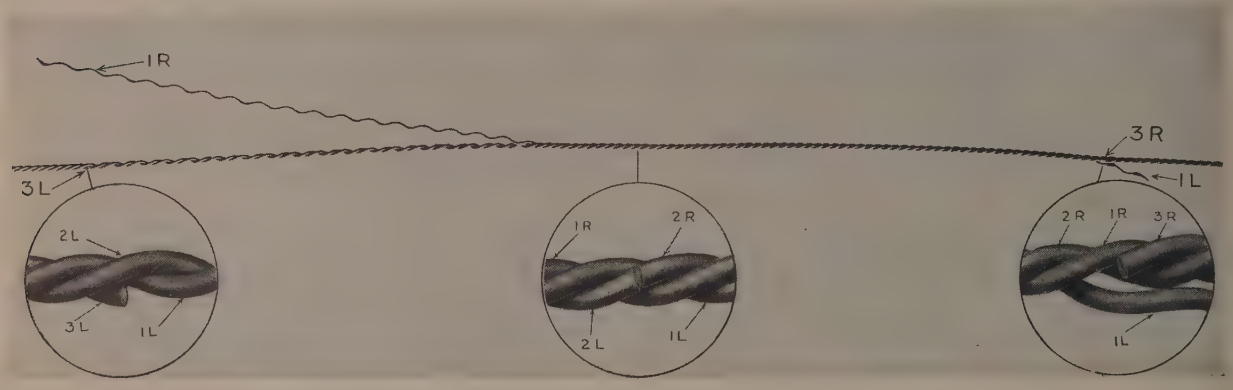


Fig. 5.

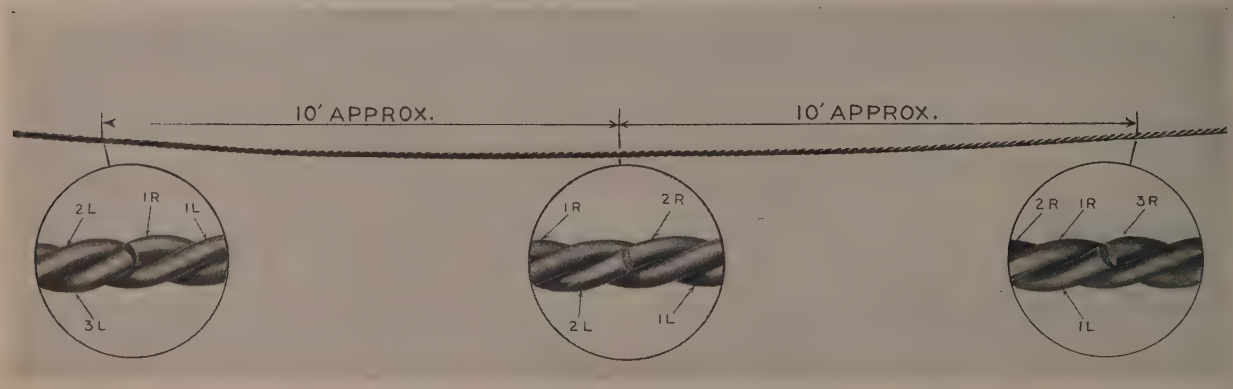


Fig. 6.

ing extremely careful to avoid disturbing the set curvature of the wires. Ordinary wire-cutters may be used for this purpose. Each of the two ends of the strand to be spliced should be prepared in exactly the same manner, making certain that the proper wires, as shown in Fig. 3, are cut, as otherwise the two pieces of the strand will not fit together. Note that the distance from the ends of the wires *1R* and *1L* to the ends of the wires *2R* and *2L* is made 10 ft. 6 in. and that the distance from the ends of *2R* and *2L* to the ends of *3R* and *3L* is 10 ft.

Lay the ends of the strand together as in Fig. 4 so that wire ends *2R* and *2L* will butt. Then, starting on one side, such as to the right of the butted ends *2B* and *2L*, commence laying in the wire *1L* in the space previously filled by wire *2R*.

Continue laying in wire *1L* until the end *3R* is reached. Fig. 5 illustrates this stage, and it will be noted that the end of wire *1L* projects a few inches beyond wire end *3R*. Next mark this slight projection of *1L* so that when it is cut and the end of the wire is laid in place it will butt well against the end of wire *3R*. Then cut wire *1L* at the place marked and complete laying it in place.

Proceed in the same manner with the wires to the left of butted ends *2R* and *2L* and lay wire *1R* in the space previously filled by *3L*. Fig. 6 shows the finished splice.

Great care should be taken during all the splicing

(*Continued on page 44*)

Destructive and Deflationary Purchasing

"Destructive Buying — Deflationary Purchasing" is the title of a special letter recently sent to its members by the Steel Founders' Society of America. It makes a strong plea for sensible buying, rather than the kind that seeks to beat down the seller to the lowest price attainable. It is reported here because its argument is equally applicable to the nonmetallic-mineral industries, which, in keeping with many other industries, have often sold their products at ridiculously low prices and, as a consequence, have sought to buy their own supplies and equipment at profitless prices.

THERE are two sides to every question. Much has been said about senseless selling at prices which can not cover costs and the evils which recoil upon the seller. His guilt, however, must be shared by another element that contributes to these practices—the buyer—who, in some cases, is the instigator.

"Let the Buyer Beware" has a sinister meaning to-day. Piratical methods of sharp purchasing in many instances are forcing business, labor, and capital deeper into the mire of depression. The buyer's own company must go with the others and cut salaries, reduce employment and, perhaps, liquidate. He is "sharping" himself out of a job.

The economics of this statement are simple. There can be no prosperity without profits. Without profits there comes a drop in employment, income and living standards. Where there is no surplus purchasing power there is no market for anything except the strict necessities. The buyer who plays his sources of supply against each other to the last dollar is drawing the life-blood of business prosperity.

While we point to the buyer as contributing to this condition, his management is responsible. They dictate his policy. The buyer would, in most cases, prefer to interview one supplier rather than ten. But his orders for competitive bids and lowest prices cause him to go to extremes to make a record and hold his job. Management should be made to see the dangers of destructive buying, not in vague terms of national welfare, but in personal terms of its own security.

The vicious circle is everywhere apparent. For example, steel foundries sell to fabricators of automobile materials. Automobiles are sold to the employees of both these supplier concerns. If these employees are laid off or their wages are severely cut because of profitless business, they can not buy automobiles. Demand for materials drops still lower and the buyers of these constricting wants force still lower prices for limited volume, while the overhead climbs up in reduced operations. Who can survive under these conditions if prolonged?

The buying power of a nation dictates its prosperity. Every inhabitant is a part of its buying power. The capitalist, the executive, the white-collar salaried man, and the laborer; all contribute by their satisfied wants toward trade turnover. Their income in excess of their bare necessities brings prosperity. But profitable operation, alone, gives surplus purchasing power.

The buyer is in the saddle to-day and is using his power for all it is worth — not all buyers, of course, but the majority.

Formerly, a bank would lend money to a manufacturer upon his advance orders, or orders booked, but that no longer holds true. Many buyers regard orders as mere scraps of paper and tell the supplier that, if he insists upon fulfillment of the terms of contract, he can expect no further business. In certain lines buyers hold off payment for several months until their transactions are completed and refuse to pay interest. These practices, coupled with no-profit terms of sale, force more unemployment.

There is much agitation at present about the repeal of anti-trust laws aimed at ruthless selling. But no protection has ever been offered to industry against ruthless buying. The buyer claims no one can be made to sell his product below cost if he doesn't want to do it. The seller claims that, unless he shares in present business dictated by the buyer, he can not continue to operate or be in business when better conditions come back. Selling, not buying, should rule industry. Without sales, buying is unnecessary. The capacity of markets to absorb products should be the starting point of all planning.

The members of the Steel Founders' Society of America, Inc., are urged to start a nationwide movement for greater sanity in business relations. The buyer and his management should be made to see that unless they permit legitimate profits to be made by their suppliers, their own concern will suffer from curtailed outlets. The seller should quote a firm bid and stick to it.

Steel foundries should discourage their own purchasing agents from the policy of destructive and deflationary buying. Executives and salesmen should discuss with all customer purchasing agents and executives the grave responsibility they assume by their buying policy and the inevitable results which will come to them personally, their companies, their stockholders, and business in general. Their attention should be called to the men who have been thrown out of work, the salaries that have been cut, the companies who are on the verge of bankruptcy, because of profitless buying which automatically kills the ability of the public to satisfy its wants. These wants are piling up and only need employment and income to be released in a tidal wave of orders.

Loading trucks and drilling in quarry.

Conveyor from bins to fine crusher.

Another Asphaltic-Rock Plant Rises in Uvalde Area of Southern Texas

New Operation of Texas Rock Asphalt Co. Has Maximum Capacity of 1,000 Tons Daily

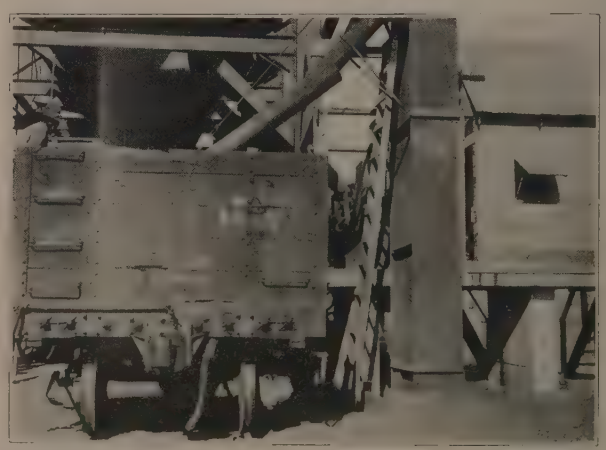
THE use of asphalt for medical and other purposes dates back almost to prehistoric times, but it is only in recent years that the material has been used extensively for road-building. Natural rock-asphalt pavements were first laid in Europe about 60 years ago and in the United States a few years later. Because of the scarcity of deposits in this country and the expense of shipping this material, however, it was at first used only locally.

The two important rock-asphalt producing states are Kentucky and Texas, although many other states produce this material in smaller quantities. The deposits in the former state consist of impregnated sandstone and in the latter of impregnated limestone. The Texas deposits are the more extensive and are now being utilized to a greater extent. The most important rock-asphalt deposits in Texas are in Uvalde County, which is in the southern part of the state, about 100 mi. west of San Antonio. This rock contains from 8 to 12 per cent. of bitumen and is well suited for road-building.

The Uvalde deposits were first opened in 1894, when bitumen was extracted from the rock and shipped to various parts of the country. This method was soon abandoned, however, and the rock used in its natural form. This material has been widely and successfully used in Texas for both streets and highways, one county alone having more than 500 mi. of rock-asphalt pavement.

One of the smaller but more progressive producing companies in the Uvalde district is the Texas Rock Asphalt Co. This company began in 1920 by hauling out man-size rock to Cline, the nearest rail-

Another view of plant, showing bin construction and fine-material grinding and loading.



Car being loaded with fine material fed from fine crusher through elevator and spout.

road point at that time. In 1924 a crushing and storage plant was built to meet the greater demand and increasingly stringent specifications. Again in 1931 plant expansion and improvement became necessary so a new plant, using only the two crushers and a few miscellaneous items of equipment from the old plant, was built. Construction of the plant was started early in June, 1931, and it was nearly completed in July when a large contract for a road job made it necessary to start operations before the plant was fully completed. The finishing touches were made while the plant was in full operation. The new plant has a capacity of 1,000 tons per day. Shipments are made over the Asphalt Belt Ry. a distance of 18 mi. to the main line of the Missouri Pacific Ry., of which it is a branch.

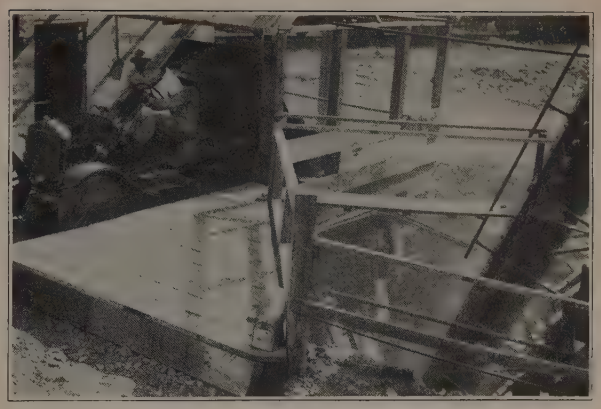
The plant is located on a property of 640 acres, which is about 22 mi. west of Uvalde, Tex. The deposit is the limestone rock asphalt peculiar to this district and has a bitumen content varying from 9 to 12 per cent. It is an almost perfect mix for highway work and any slight amount of bitumen

View from up-hill side of plant showing distributing conveyor and tripper.

needed is added as the pavement is laid. The deposit averages about 200 ft. in depth and has from 16 to 18 ft. of overburden. This consists of sandstone and crystallized limestone which is drilled and blasted and hauled away by trucks.

The quarry face now being worked varies from 30 to 35 ft. in height. Drilling is done with Ingersoll-Rand Jackhamers using ⅞-in. steel. Double-row staggered holes are drilled with a 5-ft. spacing each way and are loaded with 60-per cent. Atlas Giant quarry gelatin detonated by an electric battery. Any large blocks are broken by pop-holing.

Loading is done by hand into 1¼-cu.yd. Ford dump trucks which are now hauling a distance of 1,500 ft. to the plant. The trucks dump through a hopper to the McLanahan & Stone 21-in. by 42-in. single-roll lugged primary crusher. This is belt-driven by a 125-hp. General Electric motor and reduces the material to from 6-in. to 8-in. size. The crusher discharges to a Link-Belt chain-bucket elevator which has 24-in. by 12-in. by 18-in. buckets and operates on 76-ft. centers. This is gear-driven by a 30-hp. motor and discharges at the top of the plant to a 24-in. horizontal belt-conveyor fitted with a traveling tripper which discharges to storage.



Truck discharging load to primary crusher. Elevator to storage at right.

The steel storage-bin is a single-compartment parabolic unit, 60 ft. long by 27 ft. wide at the top, and it has a capacity of 1,000 tons. It can discharge through any of ten gates and chutes to cars on either of two tracks below for shipment direct from storage. When finer material is desired, three additional chutes discharge to an 18-in. horizontal belt-conveyor which discharges to a Williams No. 52 hammer-mill. This reduces to ¼-in. minus to meet state specifications and discharges to a steel-inclosed bucket elevator which discharges through a chute into cars. The hammer-mill is direct-driven by a 100-hp. General Electric motor.

Link-Belt conveyor idlers and Link-Belt "Service Brand" conveyor belting are used exclusively. The steel bins were furnished by the Alamo Iron Works although not made by them. Air for the six quarry drills is furnished by a Sullivan Class WJ3 air-compressor driven by a 125-hp. General Electric motor. This machinery is housed in a machine and blacksmith shop where minor repairs are made. The plant office is located on a hill above the plant. The same building also houses the chemical and physical laboratory, where regular control tests are made, and the general store. All the plant officials and employees live near. E. M. Ellis is chief engineer and T. J. Vondy is general superintendent.

T. J. Vondy, general superintendent, and E. M. Ellis, chief engineer.

The Proposed Sales Tax and How It Will Affect Producers

(*Continued from page 30*)

their attention the competitive inequalities in respect to ready-mixed-concrete which would be imposed by the sales tax provision as it now stands. They should urge support for a proposal for the establishment of a flat sales-tax rate on ready-mixed-concrete which will preserve existing competitive relationships with the job-mixed method. Ample precedent for such a flat rate as compared with the percentage rate has already been established even in the present bill in the case of lubricating oils, which are assessed at a flat rate of 4 c. per gal. in Sec. 601 (d).

The bill is still in the house and there is time, if producers act quickly, to get the bill amended in the house in a suitable fashion in order to eliminate the inequalities of the bill in the case of ready-mixed-concrete producers. If producers should not succeed in getting the bill amended in the proper fashion in the house, they will still have time to correct the legislation when it reaches the senate and is referred to the senate finance committee for hearings and report.

Phosphate-Rock Industry Reports 35-Per Cent. Drop in Business

Preliminary compilations on the raw phosphate-rock industry in 1931 indicate substantial declines in both mine production and shipments, according to a statement by the United States Bureau of Mines. Figures compiled from preliminary reports of producers in the United States in 1931 show a decrease of 35 per cent. in mine production, as compared with 1930. Shipments of phosphate rock in 1931 show decreases of about 36 per cent. in quantity and 35 per cent. in value, while total stocks increased about 27 per cent.

The quantity of phosphate rock mined in the United States in 1931 was approximately 2,563,300 long tons, compared with 3,951,353 tons in 1930. Total shipments of phosphate rock in 1931 were approximately 2,492,500 long tons, valued at $9,085,643, as compared with 3,926,392 long tons, valued at $13,996,830 in 1930. Total stocks on hand December 31, 1931, amounted to about 1,229,100 long tons, as compared with 968,745 tons on hand December 31, 1930.

The quantity and value, by States, of the various kinds of phosphate rock sold or used by producers in 1930 and 1931, the average value per ton, and the amount of stocks on hand December 31 for those years, were as shown in the accompanying table.

Florida.—Total shipments of phosphate rock in Florida in 1931 decreased 38 per cent. in quantity and 35 per cent. in value. Hard-rock shipments showed decreases of 30 per cent. in quantity and 28 per cent. in value. In comparison with 1930, decreases of 38 per cent. in quantity and 35 per cent. in value were recorded in land-pebble shipments. Stocks of phosphate rock on hand December 31, 1931, were about 997,000 tons, as compared with 798,000 tons on December 31, 1930.

Tennessee.—Practically all phosphate rock mined in Tennessee in 1931 was brown rock. The total production in Tennessee (brown and blue rock) was 363,453 long tons, as compared with 618,341 tons in 1930. Shipments were reported to be 344,677 long tons, valued at $1,558,858, as compared with 611,045 long tons, valued at $2,938,525 in 1930. These figures indicate decreases of 44 per cent. in quantity and 47 per cent. in value.

Idaho.—The quantity of phosphate rock mined in Idaho in 1931 was 52,851 long tons, as compared with 64,129 tons in 1930. Shipments were reported to be 54,941 long tons, valued at $201,180, as compared with 59,932 tons, valued at $234,543 in 1930.

Montana.—Practically all phosphate rock commercially mined in Montana in 1931 was obtained from the Anderson mine, in Powell County. The mine was in continuous operation during the year, and the output was over 60,000 long tons.

Despite lessened demand, with resultant curtailment of production and shipments of phosphate rock in 1931, actual sales prices as well as quoted prices in trade journals were firm, and in general were equal to those in 1930. Encouraging signs of activity appeared at times in an otherwise dull market, but summation of conditions reveals that there was practically no new business in the raw phosphate-rock industry during the year, and buying was confined largely to material under contract.

Total imports of crude phosphate rock into the United States for the first eleven months of 1931, amounted to 13,570 long tons, valued at $163,840.

Total exports of crude phosphate rock for the first eleven months of 1931 were reported to be 897,890 long tons, valued at $4,034,459. They consisted of 92,030 long tons of hard rock, valued at $534,534, and 805,860 long tons of land-pebble rock, valued at $3,499,925.

PHOSPHATE ROCK MINED, SOLD OR USED BY PRODUCERS IN THE UNITED STATES, BY STATES, BY KINDS, THE AVERAGE VALUE PER TON, AND STOCKS ON HAND DECEMBER 31, 1930 AND 1931

State	Mine Production (*Long tons*)	Shipments			Stocks	
		Quantity (*Long tons*)	Value		Dry (*Long tons*)	Wet (*Long tons*)
			Total	Average		
Florida:						
Hard rock	24,634	57,079	$371,015	$6.50	13,348	25,561
Land-pebble	2,056,322	1,969,690	6,661,235	3.38	198,373	759,755
Soft rock	[3]	[3]	[2]	.....	[3]	[3]
1931[1]	2,080,956	2,026,769	7,032,250	3.47	211,721	785,316
1930	3,261,539	3,248,071	10,790,305	3.32	186,675	611,304
Idaho (Western rock):						
1931[1]	52,851	54,941	201,180	3.66	2,003	2,247
1930	64,129	59,932	234,543	3.91	1,890	161
Montana (Western rock):						
1931[1]	66,078	66,078	293,355	4.44	.....	.....
1930	6,005	6,005	27,457	4.57	.....	.....
Tennessee: (Brown and blue rock):						
1931[1]	363,453	344,677	1,558,858	4.52	48,474	179,352
1930	618,341	611,045	2,938,525	4.81	51,872	116,308
Grand total 1931[1]	2,563,338	2,492,465	9,085,643	3.65	262,198	966,915
1930	3,951,353	3,926,392	13,996,830	3.56	240,526	728,219

[1] Figures are 1931 represent preliminary reports by producers covering eleven months' actual operation plus an estimate for December.
[2] Included with land-pebble.

Technical Progress in Concrete Making Reported at A. C. I. Meeting

More Than 300 Persons Attend Gathering; S. C. Hollister of Purdue New President

IN spite of present business conditions, the American Concrete Institute had a successful meeting March 1 to 4 in Washington, D. C., with a registration of more than 300. The program of this convention had more time set aside for inspection trips and general sight-seeing than has previously been customary. Trips were arranged for visits to the work of John J. Earley, sculptor, Washington, who has contributed a new technique to the field of concrete, in which concrete becomes a plastic mosaic in its placing, and of great beauty of color and texture when finally hard, cleaned and finished. Notable examples of this work in Washington are in the Church of the Sacred Heart, the interior, and in *The Rosary* at the Franciscan Monastery. Other trips were arranged to the Arlington experimental station of the Bureau of Public Roads and to the Bureau of Standards. At the Bureau of Standards a test was made of a reinforced-concrete column having a 20-in. by 20-in. cross-section and 2.35-per cent. longitudinal reinforcement. This column was 7 days old (Incor cement) and carried an ultimate load of nearly 2,000,000 lb. Another interesting demonstration at the Bureau of Standards was the manufacture of an aërocrete slab.

An extraordinary part of this convention was the awarding of eight honorary membership certificates at the annual dinner. Previous to this awarding, only two honorary memberships have been given by the institute. The first honorary membership was awarded to the late R. L. Humphrey, first president of the institute and the second was awarded to the distinguished Swiss engineer, Adolf Buhler. Certificates of honorary membership were presented to eight men who have had an important part in the development of the American Concrete Institute in the 27 yr. of its history. They are: Edward D. Boyer, William K. Hatt, Robert W. Lesley, Arthur N. Talbot, Sanford E. Thompson, Frederick E. Turneaure, Henry C. Turner, and Leonard C. Wason. All the recipients of honorary memberships except Messrs. Hatt, Turneaure and Wason were present at the dinner.

In addition to the awarding of honorary memberships, the Leonard C. Wason Medal for the most meritorious paper presented at the 1931 convention of the institute was presented this year in duplicate to Raymond E. Davis and Harmer E. Davis for their joint paper *Flow of Concrete Under the Action of Sustained Loads.* The Wason Research Medal was presented to Prof. M. O. Withey for the work reported in his 1931 paper *Long-Time Tests of Concrete.* Henry C. Turner, past president of the institute, presented the Henry C. Turner gold medal, awarded occasionally for distinguished service in the field of concrete engineering, to Duff A. Abrams, retiring president of the institute, for his discovery and statement of important fundamental principles governing the properties of concrete and reinforced concrete.

PROF. S. C. HOLLISTER of Purdue University was elected the new president of the institute and and John J. Earley was chosen by the board of direction to fill the vacancy in the board created by Prof. Hollister's elevation to the presidency.

The masonry and product field was well represented by a number of papers. E. M. Brickett (Lehigh Portland Cement Co.) presented a paper, *Preliminary Studies of High-Pressure Steam Curing,* by J. C. Pearson and E. M. Brickett. This paper reported the result of an investigation on the effect of the amount and length of steam-pressure curing on the strength of concrete specimens. The strength was found to increase very fast during the curing in high steam-pressure. The strength increased both with the pressure of the steam and with the length of time used in the curing. Tests of different cements revealed that cements giving high strength, when cured in an ordinary moist room, did not necessarily give the higher strength when cured in high-pressure steam. A study of the aggregates used in the specimens indicated considerable difference in the strength of steam-cured concrete due to the type of aggregate. Crushed limestone seemed to give lower strength than did siliceous gravel.

Prof. Fred R. Lear (Syracuse University) gave a very interesting talk on *Cast Stone as a Means to Color in Architecture.* The colors were produced by mineral pigments. Mr. Earley, in discussing the paper, questioned the limitation of producing lasting colors by means of pigments.

J. C. Pearson (Lehigh Portland Cement Co.) gave a review of *Properties and Problems of Masonry Cements,* and made an attempt to list the most important properties, such as plasticity, volume change, bond strength, durability, rate of stiffening, efflorescence, etc. Lee S. Trainor, in discussing the paper, pointed out that excellent results have been secured by the use of ordinary lime mortars in masonry.

The properties of masonry walls were given in three papers: Prof. F. E. Richart reported on the *Structural Performance of Concrete Walls;* Messrs. Copeland and Timms (Portland Cement Assn.) on *The Effect of Mortar Strength on the Strength of Concrete Masonry Walls;* and C. A. Menzel (Portland Cement Assn.) on *The Strength of Concrete Masonry Walls After Standard Fire Exposure.*

In the first two papers the relation between the

strength of wallettes and larger walls was established, and the relation between the strength of the units and the strength of the walls in which the units were used. It was found that the strength of the walls was approximately 90 per cent. of the strength of the wallettes and approximately 50 per cent. of the strength of the units. The type of aggregate used in making the units had little, if any, influence on the strength of the walls, except as it affected the strength of the units themselves. If the potential strength of the units is to be realized in the wall, the mortar used in laying up the units must be at least as strong as the units themselves at the time of the test.

Menzel's paper presented the results of testing 175 concrete masonry walls, which had been exposed to fire previous to the testing to failure. A definite relation was found between the strength of a well before and after the exposure to fire, and also between the strength of wall and that of the units. Mr. Ingberg, in discussing the paper, pointed out the importance of certain types of aggregates for concrete exposed to fire.

STUDIES of the fundamental properties of concrete were reported in several papers. R. E. Mills (Research Assistant,, Purdue University) presented a paper on *Volumetric Changes in Neat Cements and Mortars,* in which it was pointed out that different cements may show great differences in volumetric changes.

F. R. McMillan presented a paper by T. C. Powers (Portland Cement Assn.), *Studies of the Workability of Concrete.* The apparatus used in this study measured the remolding effort required to change a mass of fresh concrete from one definite shape to another by means of jigging. For any special material workability is determined by the combined effect of three factors: (a) quantity of cement-water paste (including admixtures, if any) per unit volume of concrete, (b) consistency of the paste, which is dependent on the relative proportions and the kind of material of which it is composed, (c) gradation and type of aggregate. The remolding test appears to provide an indication of the amount of placing effort required by a mix under certain conditions. The results of the gradation of aggregates add new emphasis to the importance of designing mixtures to utilize local material or to produce quality concrete at minimum cost. The basic conception underlying this study of workability of concrete mixtures is that in all plastic mixes of fluid and solid, the fluid forms a continuous body in which all the solids are suspended and have some freedom for movement. The general study of workability is largely a consideration of the conditions necessary to plasticity and of those factors which affect the degree of plasticity and mobility.

G. A. Smith, in discussing Mr. Power's paper, presented a very interesting comparison between the results obtained by the remolding test and those obtained with the penetration apparatus. It was shown that a very close relation existed between these two methods of measuring the workability of concrete.

Prof. Hollister (Purdue University) presented a paper on *Test of Concrete from a Transit-Mixer.* The purpose of this investigation was to determine: (a) the effect of the time of mixing on the strength of a concrete, (b) the effect of the time of mixing on the uniformity of the concrete, (c) the effect of the rate of rotation of the mixer and the addition of water to restore the slump of the concrete. His results were in agreement with those reported by the late Prof. Slater in a paper *Tests of Concrete Conveyed from a Central-Mixing Plant,* as far as composition of the concrete was concerned. Regarding the effect of the time of transportation on the strength of concrete there was a striking difference between the results reported in the two papers. The Transit-Mixer appeared to give very little increase in the strength of the concrete with an increase in the time of mixing, while the conveyor type (reported by Prof. Slater) was found to produce a very marked increase in the strength with an increase in the length of time of conveying. This difference between the results obtained on the Transit-Mixer and on the concrete conveyor were pointed out by Mr. Chapman and others who discussed the paper.

R. W. Crum (director, Highway Research Board) presented an abstract of a paper, *The Mortar Voids Method of Designing Concrete Mixtures,* by Mark Morris (Iowa State Highway Commission). An extensive investigation on the relationship between cement, voids, the strength of mortar, and concrete has been carried out by the Iowa State Highway Commission during the past five years. The relationship established by the work of Talbot and Richart has been found to exist for all sands available for use in Iowa, and the results were in accord in so far as the basic laws of the composition of mortars and concrete and the relationship between their unit strength and their composition were concerned.

THE design of reinforced-concrete structures was discussed in a series of papers. G. S. Richardson presented a paper, *The Design of Concrete Arches in Allegheny County,* which described a number of reinforced-concrete arches recently constructed in Allegheny County, including the longest concrete span in America. Albin L. Gemeny (Oregon State Highway Dept.) presented a paper, *Freyssinet Method of Arch Construction Applied to the Rogue River Bridge in Oregon,* by A. L. Gemeny and C. B. McCullough. The Freyssinet method consists essentially of introducing into the arch by means of jacks deformations which will tend to counteract deformations due to shrinkage, temperature changes, movements of supports, etc. The first application of this method in this country was in the construction of the Rogue River Bridge, consisting of seven 230-ft. symmetrical rib arch spans with a rise of 49.5 ft.

In the absence of C. S. Whitney, author-chairman of Committee 312, Plain and Reinforced Concrete Arches, an abstract of the report was presented by Prof. C. T. Morris (Ohio State University).

Results of tests of reinforced concrete columns

which have been carried out at the University of Illinois and Lehigh University during the last two years were presented by Prof. F. E. Richart and Prof. Inge Lyse. These results had been presented as third and fourth progress reports from University of Illinois by Richart and Staehle, and from Lehigh University by Slater, Lyse, and Kreidler. The most important conclusions drawn from these tests were that the sustaining of working loads on the columns previous to testing did not affect the ultimate strength and that the ultimate strength of the columns was made up of: (a) a constant (75 to 85 per cent.) times the strength of the concrete control cylinders times the area of the concrete in the column, (b) the total yield-point strength of the longitudinal reinforcement, and (c) the total yield-point strength of spiral reinforcement times its effectiveness ratio, which was found to average about 2.0. Prof. Richart, chairman of the Column Committee, reported that the committee is studying the data with the view of preparing a recommendation of design formula of reinforced-concrete columns.

The paper, *Deflections and Vibrations in High Structures,* by L. J. Mensch was presented by title only on account of the absence of the author.

FOUR papers dealt with the construction end of concrete development. Lt.-Col. H. L. Trotter presented a paper, *Concreting Problems in the Chats Falls Power Development,* by H. L. Trotter and Wilfred Schnarr. This interesting paper described the construction of the Chats Falls project on the Ottawa River, involving 254,000 cu. yd. of concrete, of which 160,000 cu. yd. was in the dam and sluices and 94,000 cu. yd. in the power-house. The head works forming part of the power-house consist of a series of piers and connecting walls. The total length of the concrete dam is 15,000 ft. The sand used for concrete was secured from a deposit tested to a depth of 30 ft. and the course aggregate was crushed rock from the power-house site. In designing the concrete mix, 1 : 2.86 : 4.25 by weight, consideration was given to requirements for permeability and durability as well as strength. The average compressive strength at 28 days was 3,500 lb. per sq. in. Each batch of concrete was mixed for a minimum of 2 minutes. A permanent record of the number of batched per day, the time of mixing, and the duration and frequency of delays was kept by recording watt-meters. The concrete was transported from the central-mixing plant to the forms by trains having 1 cu. yd. V-dump cars drawn by gasoline locomotives, by 6-cu. yd. Western standard-gage dump cars drawn by steam locomotive, and by 1-cu. yd. V-dump cars carried on track on a standard-gage flat car hauled by a steam locomotive. Open chutes with suspended drop chutes placed concrete over large areas and demonstrated that the more vertical is the delivery end of the flexible chute the more direct the advantage obtained from the impact of the concrete, producing a better quality concrete free from segregation. The additional cost of winter protection when distributed over the quantity of concrete protected and heated did not exceed 50 c. per cu. yd. Cooling pipes with circulating water were installed in one bulkhead section of the dam. By aid of recording thermometers it was found that at the temperature used, the cooling system materially shortened the time required to return the concrete to normal temperature, but did not reduce the maximum temperature materially.

R. B. Young, in discussing this paper pointed out the efficiency of the very inexpensive field laboratory established during the construction.

L. F. Dietrich presented a paper, *Construction of Sidewalks in Extension of U. S. Capitol Grounds,* by H. D. Rouzer.

V. R. Covell (Dept. of Highways, Allegheny County) presented a paper, *The Construction of Concrete Arches in Allegheny County,* describing the construction of seven reinforced-concrete arches in connection with the Ohio River Boulevard and relocation of a section of Lincoln Highway at Pittsburgh. The six boulevard arches have spans from 150 to 400 ft. The contractor's schedule required that open approach spans and decks should be built first. Forms for arch ribs and spandrel columns were designed to be transferred practically without modification from one arch to the next one built, and steel centering to allow interchange by slight modification. For winter concreting high-early-strength cement was used in the arch ribs, closely protected by tarpaulins under which were perforated steam pipes. The George Washington bridge on the Lincoln Highway has a main central span of 460 ft., the longest reinforced-concrete span yet constructed in America. In building abutments a 400-ft, chute, equipped with two intermediate central hoppers, delivered concrete to a 2-cu. yd. receiving hopper. Centering for the superstructure was placed by means of cableways, and after one rib was poured and had attained sufficient strength the rib centering was lowered and slid into position for the other rib. The schedule seemed to warrant the use of high-early-strength cement for the arch ribs during winter construction. On ribs constructed in the spring and summer the use of high-early-strength cement was confined to the keys of the arch ribs.

The design and construction of the Mount Vernon Memorial Highway were described by R. E. Toms and J. W. Johnson, of the U. S. Bureau of Public Roads. This highway is perhaps the world's grandest and most modern thoroughfare, in many of the features of design, in its provisions for safety and convenience, in the ultimate development of beauty along the way, and because of various difficult and unusual problems solved in the construction.

D. R. Collins Reëlected President of Concrete Masonry Assn.

THE Concrete Masonry Assn., a national organization of concrete building-units manufacturers, held its annual convention in Washington, D. C., March 1 and 2, the morning session of March 2 being a joint meeting with the American Concrete Institute, also in convention in the capital.

Routine business and an address, *Designing the Unit to Fit the Job,* by Dan F. Servey, president of the Haydite Co., Kansas City, Mo., completed the morning program of March 1. The afternoon session was devoted to presentation of papers. *New Developments in the Industry,* by C. A. Menzel, fire-test engineer, Portland Cement Assn., was the first. Others were:

The Value of Research in Selling, P. H. Bates, chief, clay and silicate products division, Bureau of Standards, Washington, D. C.; *What an A. S. T. M. Specification Means to the Concrete-Products Industry,* D. E. Parsons, chief, masonry-construction section, Bureau of Standards; *Where Concrete Products Can Be Used in Federal Work,* A. J. Boase, regional structural engineer, Philadelphia office, Portland Cement Assn.; *Heavy-weight Selling of Light-weight Units,* Charles Wm. Akers, manager, Nashville Breeko Block & Tile Co., Nashville, Tenn., and *Standardizing Concrete Masonry—Unit Sizes,* Alexander B. Galt, division of simplified practice, U. S. Dept. of Commerce, Washington.

Several important papers were presented March 2 at the joint session with the A. C. I., the leading one being *The Structural Performance of Concrete Masonry Walls,* by F. E. Richart, research professor of engineering materials, University of Illinois. This was a complete report of tests conducted at the university in 1931 and sponsored jointly by the Concrete Masonry Assn. and the Portland Cement Assn.

R. E. Copeland, engineer, cement-products bureau, Portland Cement Assn., and A. G. Timms, associate engineer of the association's research laboratory, presented *The Effect of Mortar Strength on the Strength of Concrete-Masonry Walls,* the paper being read by H. F. Gonnerman, manager, research laboratory, Portland Cement Assn. This was followed by *The Strength of Concrete-Masonry Walls After Standard Fire Exposure,* by C. A. Menzel.

J. C. Pearson, director of research, Lehigh Portland Cement Co., closed the joint session with a paper, *Properties and Problems of Masonry Cements.*

The high light of the Concrete Masonry Assn. meeting was the illustrated address, *What Do We Know About the Strength of Concrete-Masonry Walls?* by W. D. M. Allan, manager, cement-products bureau, Portland Cement Assn., given on March 2. This was a complete analysis of the technical papers given at the previous session, the recent research data having been reviewed with the sales view in mind. Mr. Allan showed how each answer to a research problem can be put to work in creating more sales for concrete masonry.

After describing how the tests at the University of Illinois and the Portland Cement Assn. were conducted and showing the effect of the strength of the unit and the strength of the mortar on the strength of concrete-masonry walls, Mr. Allen compared data on concrete masonry with similar data on clay tile and clay-brick walls. He showed that concrete-masonry units generally develop twice as much strength in the wall as end-construction clay tile and about twice as much as solid brick. In other words, a 700-lb. concrete block develops as much strength in the wall as a 1,400-lb. end-construction clay tile, and a 4,000-lb. concrete block develops approximately the same strength as an 8,000-lb. clay brick, provided the units are laid up in mortar composed of 1 part Portland cement, 1 part hydrated lime, and not more than 6 parts damp, loose mortar sand.

"The chief result of the series of wall tests conducted at the University of Illinois," said Mr. Allan, "is that now, for the first time, comparative information regarding concrete masonry and competitive materials is available."

D. R. Collins, sales manager, Economy Concrete Products Co., Wauwatosa, Wis., was reëlected president of the Concrete Masonry Assn. First Vice-President Austin Crabbs, the Cement Products Co., Davenport, Ia., and Secretary-Treasurer Jack Franklin, Milwaukee, Wis., also were reëlected.

A. U. Cote, general manager, the Cooksville Co., Ltd., Toronto, Ont.; F. R. Zaugg, manager, Concrete Masonry Units Co., Tacoma, Wash.; Dan F. Servey; and Charles Wm. Akers were newly elected directors for 1932. The 1931 directors retained were: D. R. Collins; Austin Crabbs; M. W. Ferguson, Roanoke, Va.; Nolan Browne, Dallas, Tex.; Daniel Colmar, Albany, N. Y.; Ben Wilk, Detroit, Mich.; A. V. Johnson, Omaha, Neb.; and George Saffert, New Ulm, Minn.

Methods of Splicing Wire Saws

(*Continued from page 36*)

operations to avoid disturbing the set curvature of any of the wires, as any change in this curvature will make it difficult to form a smooth and uniform splice. Furthermore, all wire ends which are butted should be forced firmly in place, for if these ends are allowed to project even slightly, subsequent operation of the splice in service may cause these wire ends to catch against some obstruction and pull out and thus ruin the splice.

Agricultural Limestone Found to Be Profitable for Cotton Growers

Experiments conducted by the Georgia Experiment Station show that the use of dolomitic limestone in cotton fertilizers containing sulphate of ammonia is a very profitable investment for farmers in the Piedmont section of the state. In these experiments increases of 100 to 200 lb. of seed cotton are often obtained from small amounts of limestone where the fertilizers contain sulphate of ammonia.

Sulphate of ammonia as well as a number of other forms of ammonia nitrogen has a tendency to make the soil acid. Limestone used in proper amounts will counteract this tendency and increase the efficiency of such nitrogen carriers.

In experiments located on the Experiment Station grounds it was found that in every case better stands were obtained on the limed than on the unlimed plots.

MEN OF THE INDUSTRY

The portrait printed on this page in each number of PIT AND QUARRY is selected without significance as to current events or the position of the individual in the industry.

BRUNER R. PENNIMAN

Vice-President and General Manager
Penniman Concrete & Material Co.
Dallas, Tex.

Coming Events

April 6, 1932. Chicago, Ill. Tenth Annual Midwest Safety Conference. G. G. Traver, manager, Chicago Safety Council, 130 N. Wells St., Chicago.

April 14, 1932. St. Louis, Mo. Monthly meeting, St. Louis Quarrymen's Assn., Forest Park Hotel. E. J. McMahon, exec. sec., 4063 Forest Park Blvd., St. Louis, Mo.

April 19-21, 1932. Columbus, O. Fifth All-Ohio Safety Congress. T. P. Kearns, Ohio Industrial Commission, Columbus.

May 5, 1932. Newark, N. J. Eighth Annual Eastern Safety Conference. F. M. Rosseland, secretary, Newark Safety Council.

May 19, 1932. Erie, Pa. Seventh Annual Northwestern Pennsylvania Safety Conference. S. M. Lippincott, secretary, Erie Safety Council.

June 20-24, 1932. Atlantic City, N. J. Annual meeting of American Society for Testing Materials. C. L. Warwick, secretary-treasurer, 1315 Spruce St., Philadelphia, Pa.

October 3-7, 1932. Washington, D. C. Twenty-first Annual Safety Congress, National Safety Council. W. H. Cameron, secretary, 20 N. Wacker Drive, Chicago, Ill.

Pumpings from the Old Pit

Excerpts from the old files of PIT AND QUARRY *reveal many interesting sidelights on the activities of the pits, quarries and plants of former days. These are printed in this column each issue.*

Fifteen Years Ago

ARTICLES of incorporation were granted the Repton Sand Corp. of Richmond, Va. The concern was capitalized at $50,000. John Mitchell, Jr., was president, and D. P. Bragg was secretary. Both were residents of Richmond.

* * *

A model gravel plant was being erected by C. E. and C. W. Wood on their ranch property located near Los Banos, Cal. The plant was to be operated entirely by electricity supplied from the power lines of the San Joaquin Light & Power Co. All material was to be sized and washed and delivered by motor truck.

Ten Years Ago

THE Dixie Coal, Lime & Clay Co. of Dayton, Tenn., announced plans for the erection of a hydrating plant on a 100-acre tract acquired by the company near Graysville, Tenn. According to O. E. Thomas, president, the new operation would have an initial capacity of 50 tons per day.

* * *

Six new kilns were being installed at the Genoa, O., plant of the United States Gypsum Co.

* * *

The New England Lime Co. of Danbury, Conn., awarded a contract to the Berlin Construction Co. of Berlin, Conn., for the rebuilding of its plant at New Milford, previously destroyed by fire.

* * *

Wilson K. Page, for many years connected with the Western New York & Pennsylvania Traction Co., resigned to become associated with the Allegheny Sand & Gravel Co., of Olean, N. Y.

* * *

A farmer in the vicinity of Hummell, Pa., was awarded $200 damages by a local court to recompense him for the loss of a cow which died, so he claimed, from drinking water containing sand discharged from the plant of the Hummell Glass Works. Although the company attempted to show that the same type of sand formed the bed of the creek in which the animal was wont to quench her thirst, the court ruled otherwise.

* * *

Sand-and-gravel producers in the Pittsburgh district reported active business. Building sand, f.o.b. barge, was being quoted at $1.60 per ton, while material at the waterfront was selling at $2.00. Crushed stone was being delivered to the job at $5.50 per ton from Pittsburgh supply yards, while Portland-cement prices were firm at $3.00 per bbl. delivered.

Five Years Ago

RICHARD K. MEADE & CO., engineers, were nearing completion in the construction of the new lime plant of the New Jersey Lime Products Corp. at Ogdensburg, N. J. The operation was said to be one of the first to employ rotary kilns for the burning of the rock.

* * *

The Georgia Portland Cement Corp., at its annual meeting, elected the following officers: J. Lee Hankinson, president; John C. Hagler, vice-president; and H. W. O'Neill, secretary-treasurer. New members of the board of directors included: C. W. Skinner, J. B. Tarbutton, T. I. Harrison, W. S. Preetorius, Thos. J. Hamilton, L. H. Charbonnier, and Herbert C. Lorick.

* * *

Plans were in progress for the first annual Central States Safety Congress to be held at Kansas Ctiy, Mo. The cement section was to meet as part of the Congress under the chairmanship of W. P. Sabin of the Portland Cement Assn. Speakers on the program were to include Harold R. Williams, Ash Grove Lime & Portland Cement Co., and Henry A. Reninger, Lehigh Portland Cement Co.

* * *

The Keystone Portland Cement Co. was preparing to erect a 3,000-bbl. cement plant at Bath, Pa., employing the wet process.

Leather Belting to be Specified by Thickness

The American Leather Belting Assn. has decided that, for the greater protection of the consumers of leather belting, it should establish and sell this commodity by specifications of thickness instead of weight, thereby discarding the old weight terminology of "ounces per square foot" which may be varied by the mere addition of weighting materials to the leather, and does not necessarily always represent a differential in transmission values. This decision was reached after the association had canvassed all manufacturers of belting throughout the country, with the result that 81 replies were received, all voting for the change. Therefore, the movement can be considered as having the endorsement of the entire industry.

This is an interesting and progressive move for the purpose of establishing higher standards for a product that has been sold by weight for many years. Inasmuch as leather belting prices are based on thickness, the simplicity and common sense of this change has met with the instant approval of both manufacturers and users of leather belting. It simplifies and makes comparatively easy the checking of each piece of belting to see if the average thickness is as ordered.

The thickness specifications now in effect for first quality leather belting are as follows:

Medium Single	$\frac{10}{64}$ to $\frac{12}{64}$ in.
Heavy Single	$\frac{12}{64}$ to $\frac{14}{64}$ in.
Light Double	$\frac{15}{64}$ to $\frac{17}{64}$ in.
Medium Double	$\frac{18}{64}$ to $\frac{20}{64}$ in.
Heavy Double	$\frac{21}{64}$ to $\frac{23}{64}$ in.

Appoints Representative

The Frick-Reid Supply Corp. of Pittsburgh has been appointed representative of Gears & Forgings, Inc., to handle the G and F line of speed reducers in that territory.

Personal Mention

Rufus Miller and **Thannie Boydston** have been patients in a St. Joseph, Mo., hospital recently following an accident in a crushed-stone quarry near Dearborn, Mo. The men were buried under a rock slide but were quickly rescued by fellow workmen. They suffered only minor injuries.

G. S. Jones is reported to have opened a plant near Lagro, Ind., for the manufacture of rock wool, spun from limestone obtained in that vicinity. The product is to be sold for insulating purposes.

S. C. Hollister of Purdue University, Lafayette, Ind., has been installed as president of the American Concrete Institute, which held its annual meeting at Washington, D. C., March 1 to 4. He succeeds **Duff A. Abrams.**

W. A. Olen, president and general manager of the Four Wheel Drive Auto Co., of Clintonville, Wis., has been chosen a member of the board of directors of the American Road Builders' Assn. Mr. Olen has long been an advocate of better roads and has always given considerably of his time in promoting improved highways for modern transportation.

Amie Brasseur, an employee of the Campbell Stone Co. in its quarry at Afton, Mich., was miraculously saved from death after being imprisoned ten hours in a slide of material at the quarry recently. Mr. Brasseur was buried by the slide while at work on the quarry floor. With thousands of tons of stone above him, he was saved from being crushed due to the fact that the rock had arched over him when he was caught. Hundreds of villagers joined the rescue party after the slide occurred in the afternoon, and he was found unharmed by the workers shortly before midnight.

E. P. Happel of Luxemburg, Wis., was elected pesident of the Casco Gravel Co. of Green Bay, Wis., at the annual meeting of the company held recently. Other officers are: **M. P. Peot,** vice-president; **W. H. Clark,** secretary; and **G. W. Rickert,** treasurer.

Sewell L. Avery, president of the United States Gypsum Co. and chairman of the board of Montgomery Ward & Co., has been elected a director of the Commonwealth Edison Co. of Chicago, Ill., to fill the vacancy caused by the death of Henry A. Blair.

John R. Dwyer has been chosen to serve as technical assistant to Committee C-1 on Cement of the American Society for Testing Materials. He will make his headquarters at the U. S. Bureau of Standards at Washington, D. C.

L. E. Williams, superintendent of operations and assistant treasurer of the Ray Sand & Gravel Co. of Detroit, Mich., was chosen director-at-large of the Michigan Engineering Society at its annual convention, held recently at Kalamazoo, Mich.

T. B. Warden has been appointed district engineer in Texas by the Portland Cement Assn. Mr. Warden formerly directed the highway activities of the Texas Chamber of Commerce.

R. S. Wilson, Jr., who has been general manager of the Winfield, La., operations of the Louisiana Quarry Co., has been succeeded by **Mallory Jenkins.**

William M. Holm, who has been engaged in the ready-mixed concrete industry at Albuquerque, N. M., for a number of years and before that time an assistant to A. C. Irwin, manager of the railways bureau of the Portland Cement Assn. at Chicago, has been appointed a field engineer by the Yosemite Portland Cement Corp. Mr. Holm makes his headquarters at the company's new main offices at 444 Market St., San Francisco, where they were moved recently from Merced, Cal.

C. H. Crocker, comptroller, Worthington Pump & Machinery Corp., has been elected vice-president in charge of a newly-organized unit called the Comptrollers' Division of the American Management Assn.

S. R. Willock has resigned as vice-president and director of the Wellman Engineering Co. of Cleveland, O. His plans for the future have not been announced.

James Rich, Cassville, Mo., contractor, is planning to erect a small crushed-stone plant this spring, it is reported.

T. H. Huling, plant engineer at the LaSalle, Ill., plant of the Alpha Portland Cement Co., was painfully burned while at work recently when a steam pipe near which he was working blew out. He has resumed work, however, after being incapacitated for several days.

Herbert S. Crocker, consulting engineer of Denver, Colo., has been elected president of the American Society of Civil Engineers for the coming year.

C. W. Ross, who has been located at the Philadelphia office of the C. O. Bartlett & Snow Co., has been transferred to New York where he will be associated with **W. H. Norrington,** New York manager, in serving the eastern territory in connection with requirements involving conveying, drying and crushing machinery.

Obituary

Capt. John E. Weber, 65 years old, for thirty years secretary of the Casper Stolle Quarry & Contracting Co. of St. Louis, Mo., died February 13 at his home in St. Louis after a brief illness. He was a native St. Louisan and was widely known throughout the middle west among crushed-stone producers. He acquired his military title following service in the Spanish-American war, serving in Porto Rico and the occupation which followed in the Philippine Islands. He became connected with the Casper Stolle company shortly after he returned to the United States from the Philippines. Besides his widow and mother, he is survived by two sisters.

Capt. J. E. Weber.

Fred Matthews, prominent among the stone operators of the limestone district of Indiana, died at Bloomington, Ind., on March 3, after a stroke of paralysis. He was 72 years old. Mr. Matthews was president of the Matthews Brothers Stone Co., president of the Empire Stone Co., vice-president and director of the Citizens' Loan & Trust Co., and a director of the First National Bank of Bloomington.

Roy E. Hammond, 54 years old, secretary-treasurer of the Chicago Gravel Co. of Chicago, Ill., died March 1 of pneumonia in his home at Elgin, Ill. His widow, Mrs. Clara Read Hammond, and a son, David, survive.

Burrows Sloan, chairman of the board of the General Refractories Co., Philadelphia, Pa., and a business associate of the late Governor Sproul of Pennsylvania, died recently. He was in his 55th year and in good health until stricken early Sunday morning, February 28. Following his graduation from Princeton in 1899, Mr. Sloan was employed by the Reading Company and later became associated with the Harbison-Walker Refractories Co. at Philadelphia. He became president of the company in June, 1925, and was named chairman of the board in April, 1931.

Traffic News and Comment

New Complaints Filed

Amiesite. — The rates on coated stone from Pittsburgh and Casparis, Pa., are alleged to be in violation of Sec. 1 and 3 to destinations in West Virginia, Ohio, New York, and Maryland, competitors at Shaw Junction, Pa., Youngstown, O., and other points being preferred. New rates not in excess of the scale prescribed in I. C. C. Docket No. 22,598 are sought by complainant in I. C. C. Docket No. 25,028, Amiesite Corp. *et al.*, Pittsburgh, Pa. *v.* A. C. & Y. *et al.*

Asphaltic Limestone.—Rates, ratings, and charges in violation of Sec. 1, 3 and 6, on natural asphaltic limestone, and asphaltic limestone containing not more than 5 per cent. of artificially-added asphalt, from Margerum, Ala., to points in official classification territory are alleged. Complainant says that competitors at points in Illinois, Indiana, Kentucky, New Jersey, New York, Ohio and Pennsylvania are preferred, and asks for new rates and reparation.—I. C. C. Docket No. 25,059, Alabama Asphalting Limestone Co., Birmingham, Ala. *v.* A. & B. B. *et al.*

Cement.—Rates on cement from Louisville, Ky., to destinations in Minnesota and the Dakotas are attacked under Sec. 1, 3 and 13, competitors in Missouri, Kansas, Illinois, Iowa, Wisconsin, Minnesota, Montana and South Dakota being preferred. Complainant asks for new rates for the future in I. C. C. Docket No. 25,026, Ash Grove Lime & Portland Cement Co. of Nebraska, Kansas City, Mo. *v.* C. B. & Q. *et. al.*

Sand and Gravel.—Rates in violation of Sec. 1 and 4 on sand and gravel from Eau Claire, Wis., to Plainwell, Mich., are alleged and reparation is sought in I. C. C. Docket No. 25,007, Michigan Paper Co., Plainwell, Mich. *v.* C. M. St. P. & P. *et al.*

Examiners' Reports

Agricultural Limestone.—Examiner H. W. Archer on further hearing in the matter of rates on agricultural limestone, in bulk or in bags in box-cars and in bulk in open-top cars, from Gibsonburg, O., to destinations in Michigan, suggests that the commission award reparation and prescribe rates for the future based on mileage scales which are shown below. In the former report, 152 I. C. C. 429, the commission found that the rates on agricultural limestone from Gibsonburg to some destinations in Michigan had been unreasonable to the extent that they exceeded rates established to such destinations on Aug. 26, 1926, and, further, that rates to other destinations in the lower peninsula of Michigan as were not reduced on that date were unreasonable to the extent that they exceeded rates based on the Michigan intrastate scale, with the addition of arbitraries for joint-line movements as provided under that scale. It was found that rates on a lower basis, distance considered, from Sibley and Monroe, producing points in Michigan, would result in undue prejudice to shippers at Gibsonburg and undue preference for shippers at the Michigan points. Complainants state that in applying the prescribed basis from Gibsonburg, carriers used circuitous routes in determining the rate. The mileage scale of rates shown below for open-top cars is to apply on agricultural limestone [1], and the scale on box-cars to apply on the same commodity, car-load minimum weight, 80,000 lb., subject to the marked capacity of the car if less, but not less than 60,000 lb. The open-top car scale is the same as that prescribed by the commission in Docket No. 15,329, and is known as the West Penn Single-Line Scale. The scale for use on box-car shipments is the same with the addition of a 30 c. arbitrary. Unlike the Michigan intrastate scale, no arbitrary is added for joint hauls. This joint-line arbitrary of 12 c. for two-line hauls and 20 c. for three-line hauls generally made the rates considerably higher from Gibsonburg than from Monroe and Sibley for actual distances, as very few destinations can be reached from the former over a single line except via a circuitous route, whereas shipments from Monroe and Sibley can move over a single line to a large percentage of the destinations.—I. C. C. Docket No. 20,039, The National Mortar and Supply Co. v. Ann Arbor et al.

Miles	Open Cars	Box Cars
40	$0.70	$1.00
60	.80	1.10
80	.90	1.20
100	1.00	1.30
125	1.10	1.40
150	1.20	1.50
175	1.30	1.60
200	1.40	1.70
225	1.50	1.80
250	1.60	1.90
275	1.70	2.00
300	1.80	2.10
325	1.90	2.20
350	2.00	2.30

Fluxing Stone.—During August, 1930, the commission, on petition of the carriers operating in Ohio, instituted a thirteenth-section investigation of the rates on fluxing stone within the state. This case was joined with the two others shown below, and involved the rates from producing points in the northwestern part of the state and from Marble Cliff, just outside Columbus, to intrastate destinations and to destinations in Pennsylvania and West Virginia near the Ohio state line. The carriers contended that the rate from producing points to Youngstown, which was $1.05 a gross ton, was substantially less than the rate of $1.26 from the same producing points to Sharon, Farrell, Sharpsville, West Middlesex and New Castle, Pa., and that the rate to Youngstown and other points in the Mahoning Valley in Ohio preferred Ohio shippers and constituted unjust discrimination against interstate commerce. The hearing in these cases was had before Examiner Frank C. Weems, who recommends that the commission find:

1. That the Ohio intrastate rates do not cause any undue prejudice or undesirable advantage, preference, or prejudice as between persons or localities in intrastate commerce on the one hand or interstate commerce on the other hand, or any undue, unreasonable, or unjust discrimination against interstate commerce and are not otherwise unlawful, except in respect of the rate from Marble Cliff to Steubenville and Mingo Junction, O.

2. That the rate of $1.13 on fluxing stone, in car-loads, from Marble Cliff to Weirton is reasonable.

3. That the maintenance of the rates of $1.05 from Marble Cliff to Mingo Junction and Steubenville and $1.13 to Weirton results in undue preference of intrastate consumers in Ohio and undue prejudice to the Weirton Steel Co., complainant in No. 23,832 (Sub. No. 1) engaged in interstate commerce, in that there is a difference in the rates on fluxing stone, in car-loads, from Marble Cliff to Weirton on the one hand and to Steubenville and Mingo Junction on the other hand. The undue prejudice should be removed by increasing the intrastate rates.

4. That, with reference to No. 23,832, the rates assailed are not unreasonable, and that the allegation therein of undue prejudice has not been sustained. Complaint dismissed.

As stated, the interstate rate from Marble Cliff to Weirton was increased 6 c. per ton of 2,000 lb. on Jan. 4, 1932, pursuant to the decision in Ex Parte 103 (the 15-per cent. case), 1931. The record of the instant proceedings discloses no justification for a difference in the rates from Marble Cliff to Weirton on the one hand and to Mingo Junction and Steubenville on the other. However, the record in the instant proceedings was closed prior to the decision in Ex Parte 103. In the circumstances the commission may not require a parity of rates from Marble Cliff to Mingo Junction, Steubenville and Weirton, but there is no justification for the maintenance of rates from Marble Cliff to Mingo Junction and Steubenville lower than the rate contemporaneously maintained from Marble Cliff to Weirton, not inclusive of the increase of 6 c. per ton of 2,000 lb., effective Jan. 4, 1932.—I. C. C.

Dockets No. 23,625, Rates on Raw Dolomite and Fluxing Stone Within the State of Ohio; No. 23,832, Marble Cliff Quarries Co. *v.* Pennsylvania *et al.*; No. 23,832, Sub. 1, Weirton Steel Co. v. Same.

Rate-Committee Dockets

New England Freight Assn.

Cement.—To meet motor-truck competition shippers are asking that the rates on cement, car-load minimum weight, 50,000 lb., from Hudson and Hudson Upper, N. Y., to Bondsville, Mass., be reduced from 13 c. to 11 c. and to Greenwich Village, Mass., from 13½ c. to 11 c.—Docket No. 24,656.

Crushed Stone.—To meet motor-truck competition shippers propose that the rate on crushed stone,[1] from Westfield, Mass., to Oak Street, Springfield, Bondsville, Enfield, Greenwich and Greenwich Village, Mass., be reduced to 45½ c. per ton. The present rate to Oak Street, Springfield and Bondsville is 50 c. and to the others is 90 c.—Docket No. 24,595.

Carriers propose to reduce the rate on crushed stone and grout or rubble, car-load minimum weight 80,000 lb., from E. Barre, Graniteville and Websterville, Vt., to Barre, Vt., from 3 c. to 2½ c. per 100 lb. to meet motor-truck competition.—Docket No. 24,694.

Sulphur.—To meet motor-truck competition carriers propose to reduce the rate on crude, not ground or refined, sulphur, car-load minimum weight 80,000 lb., from Boston to Lowell, Mass., from 7 c. to 6 c. per 100 lb.—Docket No. 24,633.

Trunk Line Assn.

Cement.—To meet motor-truck competition carriers propose to reduce the rate on cement, car-load minimum weight 80,000 lb., from Buffalo, N. Y., to Attica, N. Y., to $1.37 per net ton, to expire March 31, 1933, with a rate of $1.50 per net ton thereafter.—Docket No. M-2,024.

Carriers propose to establish a rate of 19½ c. per 100 lb., on cement, car-load minimum weight 50,000 lb., from Montreal, Que., to Philadelphia, Pa.—Docket No. 28,627, Sup. 1.

Cement Flue-Dust.—Carriers propose to establish a rate on cement fluedust, car-load minimum weight 40,000 lb., from Security, Md., to Baltimore, Md., of $1.90 per net ton.—Docket No. M-2,035.

Gypsum.—To meet motor-truck competition shippers propose that the rate on crude gypsum, car-load minimum weight 40,000 lb., from Easton, Pa., to Vulcanite, N. J., be reduced from 9 c. per 100 lb., to 70 c. per net ton.—Docket No. 28,761.

Sand.—Carriers propose to establish a rate of $2.60 per net ton on glass sand,[1] from Mapleton, Pa., district points and Tatesville, Pa., to Alloy, W. Va.—Docket No. 28,532.

Slag.—To meet motor-truck competition carriers propose to reduce the rate on slag,[1] for a period of six months, from Bethlehem, Pa., to Elkins Park, Pa., from $1.05 to 70 c. per net ton.—Docket No. 28,736.

Central Freight Assn.

Dolomite.—Carriers propose to reduce the rate on raw dolomite and fluxing stone,[1] ex lake, in open-top cars only, from Painesville and Perry, O., to Cleveland, O., from 90 c. to 80 c. per gross ton.—Docket No. 30,722.

Firestone.—Shippers propose the establishment of rates on firestone, car-load minimum weight, 60,000 lb., from Framer, Ky., to points on C. F. A. territory, also to points east of the western termini of eastern trunk lines, 20 c. per net ton higher than the present rates on brick.—Docket No. 30,681.

Carriers propose to establish commodity rates on firestone, car-load minimum weight 60,000 lb., from Coal Grove and Ironton, O., to Cleveland, Medina, Minster, $2.30; Newark, $1.65; St. Mary's, O., $2.15; Rockford, Ill., $4.20; Columbus, $2.95; Evansville, Ind., $3.60; Elyria and Lorain, O., $2.30 per net ton.—Docket No. 30,719.

Limestone.—Shippers are proposing a revision in the rates on agricultural limestone, car-load minimum weight 60,000 lb., from Danbury, Marblehead, Genoa and Martin, O., to destinations in Michigan involving reductions from 8 c. to 58 c. per net ton. A complete exhibit will be furnished on request.—Docket No. 30,749.

Quarry Refuse.—Shippers propose the establishment of a rate of $1.00 per net ton on waste or refuse stone (offal of quarry) car-load minimum weight the marked capacity of the car, except that, when the car is loaded to its full cubical or visible capacity, the actual weight shall apply, from Jamestown, Pa., to Wurtemburg and Rock Point, Pa.—Docket No. 30,664.

Sand and Gravel.—Carriers propose to reduce the rates on sand and gravel from Troy, O., to Toledo, Rossford, Bates, Perrysburg, Roachton, Hull Prairie, Haskins, Tontogany, Weston, Milton, Custer, Hoytville, North Baltimore, Bays Rudolph, Portage and Bowling Green, O., to 90 c. per net ton, and to Stanley and Defiance, O., to $1.00 per net ton.—Docket No. 30,706.

Sand, Gravel and Crushed Stone.—Carriers propose to reduce the rates on sand, gravel and crushed stone to Delphi, Ind., from Keyport to 40½ c. and to Peru and LaFayette to 50 c. per net ton. The present rate to the three destinations is 70 c.—Docket No. 30,752.

Soapstone.—Carriers propose to reduce the rates on soapstone or talc, crude, ground, in packages, car-load minimum weight 40,000 lb., except that to Sayre, Pa., the car-load minimum weight will be 50,000 lb., from Cincinnati, O., to Akron, O., to 17½ c.; to Chicago, Ill., 18 c.; Detroit, Mich., 17½ c.; Hammond, Ind., and Pittsburgh, Pa., 18 c.; St. Louis, Mo., 19 c.; Toledo, O., 15 c.; Rochester, N. Y., 23 c.; and to Sayre, Pa., to 25½ c.—Docket No. 30,737.

Illinois Freight Assn.

Sand and Gravel.—A reduction in the rate on sand and gravel from Aurora, Ill., to Kankakee, Ill., from $1.01 to 88 c. per net ton is proposed.—Docket No. 5,169-A.

It is proposed to reduce the rate on sand and gravel,[1] from Joliet, Ill., to Aurora and Minooka, Ia., from 63¾ c. to 50 c. per net ton.—Docket No. 6,500.

Soapstone.—On soapstone, refuse, crude, crushed, car-load minimum weight 60,000 lb., from Joliet, Ill., to Chicago, Ill., it is proposed to reduce the rate from $2.42 to 80 c. per net ton.—Docket No. 6,523.

Western Trunk-Line Committee

Cement.—It is proposed to publish a rate of 9½ c. on cement from Chicago, Ill., to Pleasant Prairie, Wis., 51 mi.; Woodworth, Wis., 55 mi.; Bristol, Wis., 58 mi.; Salem, Wis., 61 mi. The present rate is 10½ c.—Docket No. 7,875.

Ground Limestone.—At present there is no provision for shipment of mixed car-loads of cement and ground limestone and raw mix from Portland, Colo., to destinations in W. T. L. territory. It is proposed to provide for the application of the cement rates on mixed car-loads of cement and ground limestone and raw mix in bags or barrels.—Docket No. 7,833.

Southern Freight Assn.

Cement Car Linings.—Shippers propose the establishment of exceptions to Rule 30 of Southern Classification by publishing the following item in Agent Glenn's I. C. C. No. A-718: "Cement, in car-loads, paper lining for: When paper car-linings are furnished by shippers for the safe transportation of shipments of cement, common hydraulic, natural or Portland, in car-loads, no freight charges will be assessed for the weight of such paper car-linings, provided that in no case will less than the prescribed minimum weight be charged for."—Docket No. 57,015.

Southwestern Freight Bureau

Plaster-board and Wall-board.—Shippers propose the amendment of the first paragraph of Item 255-A, Sup. 4, S. W. L. Tariff 173-B, to read as follows: "The following articles, when destined to Texas stations, will be allowed not to exceed two stops partly to unload, subject to charges and other provisions on Items 150, 151, 152 and 153, except as otherwise provided in this item, and, further, except when the stopover point is in Texas it must be located on lines named below." It is stated that the present application of the rules discriminates against Texas and the proposed change is to correct this situation.—Docket No. 24,286.

[1] The car-load minimum weight will be 90 per cent. of the marked capacity of the car except that, when the car is loaded to its full cubical or visible capacity, the actual weight will apply.

Financial News

The information contained in these financial pages is given with the understanding that any statement on the part of this magazine or any of its staff, as to the responsibility or standing of any person, firm or corporation, or as to the value of any property or securities is a mere expression of opinion, given as a matter of service to the readers of PIT AND QUARRY, *for which no responsibility in any way is to attach to this magazine or to any of its staff.*

International Cement's Earnings $2.25 a Share

The statement of International Cement Corp. for the year ended December 31, 1931, compiled from quarterly reports, shows net income of $1,433,129 after depreciation, interest and reserve for federal taxes and contingencies, equivalent to $2.25 a share on 636,450 no-par shares of capital stock outstanding at end of year. This compares with $4,539,509 or $7.12 a share on 635,798 shares in 1930.

Net loss for the fourth quarter of 1931 was $98,978 after charges, etc., comparing with net income of $531,480 or 83 c. a share on 636,171 shares in preceding quarter and net income of $1,080,978 or $1.70 a share on 635,798 shares in final quarter of 1930.

The preliminary statement for the year compares as follows:

	1931	*1930
Gross sales	$29,916,112	$27,384,145
Costs, expenses, depreciation, etc.	26,586,733	20,908,078
Balance	$ 3,329,379	$ 6,476,067
Interest, federal taxes, etc.	1,896,250	1,936,558
Net income	$ 1,433,129	$ 4,539,509

* Actual earnings.

Income account for the quarter ended December 31, 1931, compares as follows:

	1931	1930
Gross sales	$5,997,428	$7,529,493
Costs, expenses, etc.	5,005,631	5,240,920
Depreciation	601,843	870,746
Balance	$ 389,954	$1,417,827
Interest, etc.	176,764	166,955
Federal taxes and contingent reserves	312,168	169,894
Net loss	$ 98,978	*$1,080,978

* Net income.

Alpha Cement Net Loss Reaches $778,951 in 1931

The report of the Alpha Portland Cement Co. for the year ended December 31, 1931, shows consolidated net loss of $778,951 after taxes, depreciation, etc. A write-down of $426,338 on United States government and municipal securities to market values at close of the year was charged directly to surplus account. In the year ended December 31, 1930, net income was $1,248,353, equivalent after preferred dividends, to $1.56 a share on 711,000 no-par shares of common stock.

Current assets as of December 31, 1931, including $6,027,328 cash, government and municipal securities, amounted to $8,537,250 and current liabilities were $392,064. This compares with cash and marketable securities of $7,358,472, current assets of $10,141,866 and current liabilities of $746,364 at close of 1930.

Consolidated income account for year 1931 compares as follows:

	1931	1930
Net sales	$6,012,602	$9,936,820
Expenses	5,645,344	7,366,812
Operating profit	$ 367,258	$2,570,008
Other income	223,990	185,842
Total income	$ 591,248	$2,755,850
Depreciation	1,370,199	1,337,497
Federal taxes	.....	170,000
Net loss	$ 778,951	*$1,248,353
Preferred dividends	140,000	140,000
Common dividends	711,000	1,599,750
Deficit	$1,629,951	$ 491,397

* Profit.

Consolidated balance sheet as of December 31, 1931, compares as follows:

Assets

	1931	1930
*Land, buildings, machinery, equip., etc.	$19,787,957	$21,094,226
Cash	3,478,715	5,372,272
Call loans	.....	.....
Certificates of dep.	20,000	125,000
Gov. bonds & treas. certificates, etc.	2,528,613	1,861,200
Work fund & adv.	146,416	131,898
Accts. & notes rec.	639,668	377,792
Inventories	1,723,839	2,273,705
Miscellaneous invest.	296,766	289,823
Co. common stock	‡228,965	.....
Preferred charges	159,569	158,296
Total	$29,010,508	$31,684,212

Liabilities

7% preferred stock	$ 2,000,000	$ 2,000,000
Common stock	†18,486,000	24,134,500
Accounts payable	162,195	163,225
Wages payable	8,925	17,159
Fed. taxes, etc	43,194	210,479
Dividends payable	177,750	355,500
Reserves	632,009	907,283
Earned surplus	7,500,435	3,896,066
Total	$29,010,508	$31,684,212

*After depreciation and depletion. † Represented by 711,000 no-par shares. ‡ 21,500 shares, at cost.

National Gypsum Profit Is $10.53 on Preferred

The National Gypsum Co., of Buffalo, N. Y., reports for the year 1931 net profit of $276,990, after deducting fixed charges, depreciation and bond interest. This is equivalent to $10.53 per share on the outstanding preferred stock of the company and compares with a net of $51,964 for 1930, reflecting an increase in profit of $225,026.

Shipments during the year were off about 11 per cent., M. H. Baker, president, told stockholders in the pamphlet report, but dollar volume was higher than in 1930.

The balance sheet shows current assets of $1,089,264 which includes $439,076 in cash and government securities and current liabilities of only $95,005, a ratio of more than 11 to 1, reflecting an extremely strong position. The company has no bank loans or past due obligations.

"Consistent research has enabled the company to broaden its line of products until it is now marketing thirty items," President Baker reported. "This diversity permits us to compete in three major industries—gypsum, lime and insulation. We expect further developments along this line in 1932."

Johns-Manville Dividend Omitted as Profits Drop

Johns-Manville Corp. and subsidiary companies (manufacturers of asbestos and magnesia products), report for the year ended December 31, 1931, net profit of $583,792 after depreciation, federal taxes, etc., equivalent after dividend requirements on preferred stock, to 8 c. a share on 750,000 no-par shares of common stock. This compares with $3,268,123, or $3.66 a common share, in 1930.

The corporation has omitted the quarterly dividend of 25 c. on the common stock due to be declared at this time. The regular quarterly dividend of $1.75 was declared on the preferred stock, payable April 1 to stock of record March 11.

CURRENT DIVIDENDS

COMPANY	CLASS OF STOCK	DIVIDEND RATE	HOLDERS OF RECORD	PAYABLE	COMPANY	CLASS OF STOCK	DIVIDEND RATE	HOLDERS OF RECORD	PAYABLE
Alpha Portland Cement	Preferred	$1.75 qr.	Mar. 1	Mar. 15	Owens-Illinois Alass	Common	$1.50 qr.	Jan. 30	Feb. 15
Canada Cement	Preferred	$1.62½ qr.	Feb. 29	Mar. 31	Owens-Illinois Glass	Preferred	$1.75 qr.	Mar. 16	Apr. 1
Cleveland Quarries Co	Common	$0.25 qr.	Feb. 15	Mar. 1	Riverside Portland Cement	Preferred	$1.50 qr.	Jan. 15	Feb. 1
Fitzsimons & Connell	Common	$0.50 qr.	Feb. 19	Mar. 1	Smith Agricultural Chemical	Preferred	$1.50 qr.	Jan. 21	Feb. 1
Great Lakes Dredge & Dock	Common	$0.25 qr.	Feb. 5	Feb. 15	Standard Pav. & Materials	Preferred	$1.75 qr.	Jan. 30	Feb. 15
International Cement	Common	$0.50 qr.	Mar. 11	Mar. 31	Superior Portland Cement	Class A	$0.27½M	Feb. 23	Mar. 1
International Salt	Common	$0.50 qr.	Mar. 15	Apr. 1	Texas Gulf Sulphur	Common	$0.50 qr.	Mar. 1	Mar. 15
Johns-Manville	Preferred	$1.75 qr.	Mar. 11	Apr. 1	Warner Co	1st Pfd.	$1.75 qr.	Mar. 15	Apr. 1
National Gypsum Co	Preferred	$1.75 qr.	Mar. 19	Apr. 1					

North American Cement 1931 Loss Is $496,520

Report of North American Cement Corp. for the year ended December 31, 1931, shows net loss of $496,520 after interest, depreciation, depletion, etc. This compares with net profit in 1930 of $263,092, equivalent to $5.09 a share (par $100) on 51,500 shares of preferred stock, on which there is an accumulation of unpaid dividends.

Current assets as of December 31, 1931, including $663,537 in cash, totaled $1,529,186 and current liabilities were $229,549, comparing with cash of $735,354, current assets of $1,892,407 and current liabilities of $276,631 at end of 1930.

Income Account

	1931	1930
Net sales	$3,292,557	$4,584,574
Costs and expenses	2,743,264	3,149,674
Balance	$ 549,293	$1,434,900
Other income	28,144	23,575
Total income	$ 577,437	$1,458,475
Depreciation and depletion	711,602	723,253
Interest, amortization, etc.	362,355	449,772
Federal taxes	.....	22,358
Net loss	$ 496,520	*$ 263,092
Preferred dividends	.....	88,443
Deficit	$ 496,520	†$ 174,649

* Profit. † Surplus.

Assets

	1931	1930
*R E, bldgs., eq., etc.	$12,613,782	$12,926,779
Cash	663,537	735,354
Accts. & notes receivable	205,356	364,468
Inventories	660,293	792,586
Invest. at cost	7,250	7,250
Treas. secur. at cost	241,480	298,700
Sinking fund	584	584
Deferred chgs.	545,899	608,031
Total	$14,938,184	$15,733,752

Liabilities

Pfd. stock	$ 5,150,000	$ 5,150,000
†Com. stock	1,412,500	1,412,500
Bonds	6,615,500	6,880,500
Accts. payable	40,185	56,428
Ac. wg., int., etc.	162,482	181,269
Plant addit.	.....	.....
Fed. tax res.	26,882	38,935
Reserves	72,492	62,636
Int. & earn. surp.	1,458,143	1,951,484
Total	$14,938,184	$15,733,752

* After depreciation and depletion.
† Represented by 133,250 no-par shares.

Profitable Year Looked for by U. S. Gypsum Co.

"If the United States Gypsum Co. can get the business that it is reasonable to hope for its profits this year will approximate those of 1931," Sewell L. Avery, president, told stockholders at the company's annual meeting.

Last year the company earned $3,563,143, or $2.48 a share, on 1,217,472 common shares outstanding.

"The company has operated in the black thus far this year and can continue to do so even though conditions in the building industry become slightly worse," Mr. Avery said. Every department in the company is operating at a profit, Mr. Avery said, and he expressed confidence that this record would be continued.

All directors and officers were reelected.

Regular quarterly dividends of 40 c. on common and $1.75 on preferred, both payable March 31 to stock of record March 15, were declared.

Organization Plan of Indiana Limestone Co.

Protective committees representing the bonds, debentures and preferred and common stock of Indiana Limestone Co. are recommending to the present security holders a plan providing for the reorganization of the property and business.

The plan contemplates that the assets will be acquired by a new corporation, which will have an initial capitalization based upon the participation under the reorganization plan of all of the outstanding bonds, debentures and preferred stock and the issuance of $1,500,000 new prior lien 6 per cent. sinking fund bonds, as follows:

	Authorized	Outstanding
Prior lien 6% sinking fund bonds, dated May 1, 1932, maturing May 1, 1932, maturing May 1, 1942	$2,000,000	$1,500,000
General mortgage 6% income bonds, dated May 1, 1932, maturing May 1, 1952	6,813,750	6,813,750
Common stock (without par value)	* 504,743	* 504,743

* Shares.

The new company will issue and deliver its general mortgage 6 per cent. income bonds and its common stock so that, upon consummation of the plan, assenting holders of bonds will receive in exchange for each $100 bonds $50 general mortgage 6 per cent. income bonds and 1.8 shares of common stock; assenting holders of debentures will receive in exchange for each $100 debentures two shares of common stock; holders of preferred shares will receive in exchange for each share one-half share of common stock.

New money necessary to carry out the plan and to provide adequate working capital is proposed to be raised through the issuance of $1,500,000 prior lien 6 per cent. sinking fund bonds which, together with 150,000 shares of new common stock, will be offered for pro rata subscription and purchase, successively and subject to the prior subscription rights of each senior class of securities, to bondholders, debenture holders, preferred shareholders and common shareholders who participate in the plan. Securities are to be offered in units consisting of one $100 bond and ten shares of common stock at a purchase price of $100 a unit, plus accrued interest.

Upon consummation of the plan and if all of the present bondholders, debenture holders and stockholders participate, the old bondholders will receive in exchange for their bonds one-half of their bonds in new bonds and approximately 50 per cent. of the new common stock. The old debenture holders will receive in exchange for their debentures approximately 17 per cent of the new common stock. The old preferred stockholders will receive in exchange for their preferred stock approximately 4 per cent. of the new common stock. Approximately 30 per cent of the common stock of the new company is to be disposed of for new-money purposes, and each holder of the present outstanding securities of the old company is given the right of subscription to the new prior lien bonds and common stock so to be offered.

Important economies have been effected in the company's operations and its unfilled orders have approximately doubled since the committee was organized in June, 1931. The reorganization committee believes that even under present conditions the new company as reorganized can readily earn fixed charges on the new prior lien 6 per cent. sinking fund bonds.

Use of Explosives in January Shows Decline

Use of explosives for quarrying and nonmetallic-mineral mining in January included 3,500 lb. of permissibles, 2,081,263 lb. of high explosives other than permissibles, 5,046 kegs (25 lb. each) of granular powder and 476 kegs of pellet powder, according to the U.S. Bureau of Mines.

This compares with 39,675 lb. of permissibles, 2,817,097 lb. of high explosives other than permissibles, 11,809 kegs of granular powder and 1,769 kegs of pellet powder used in the same month in 1931.

Names Distributors in Chicago and Cleveland

The Burke Electric Co. of Erie, Pa., manufacturers of motors, generators, electric welders, etc., announces that distribution of its lines in the Chicago district will be handled by Albert J. Walz as distributor.

Mr. Walz is located at 205 West Wacker Drive, Chicago, Ill.

The Burke Electric Co. also announces that P. J. Burrill and J. L. Vergillio are likewise general distributors for northern Ohio and are located at 942 Prospect Ave., Cleveland, O.

To Distribute Asbestos and Magnesite Products

The Pacific Asbestos & Supply Co., Portland, Ore., has taken on the Oregon distribution of the products of the Philip Carey Co., Cincinnati, O., including asbestos and magnesite products.

The Pioneer Sand & Gravel Co., of Seattle, Wash., and the Nott-Atwater Co., of Spokane, Wash., have taken on the distribution in Washington for Philip Carey products.

Review of Foreign Practice

Corrosion Related to Water Content of Mix

The effect of the water-cement factor on the strength of concrete has been recognized for a number of years, as established by work such as that of Abrams. Additional information on the importance of the water-cement factor is contributed in this article, in which one test, in conjunction with a more general investigation, called for storing test specimens of varying content of mixing water in a 15-per cent. sodium-sulphate solution. The results showed clearly the greater susceptibility to the action of aggressive or corrosive waters of concrete with increasing water content, and show the importance of this consideration in mixing concrete for use in contact with corrosive waters. In practical work, this investigation shows that concrete for such use must be mixed with the lowest practical water-cement ratio. For scientific investigations, it points out the importance of taking this factor into account in all comparative work in corrosive soils or waters.—Dr. Karl E. Dorsch in *Zement* 21:61-64, Feb. 4, 1932.

Investigation of Trass Cement Is Unfavorable

For some time there have been on the German market what are called "trass-Portland cements," bearing on their packages the indication of their proportion of Portland cement to trass —70:30 or 50:50—and for which are claimed such advantages as greater adhesion, prevention of shrinkage, high elasticity, and the like. The authors made an investigation of such mixed cements at the Research Institute of the Union of German Iron-Portland-Cement Producers, using partly the commercial brands and partly laboratory mixes, since the commercial brands were found not always to have the same proportions as claimed.

The trass-Portland cements produced in the laboratory, tested as earth-moist standard mortar, showed, for the 70:30 mix, lower initial strengths than the plain Portland cements of equal fineness. On the other hand, the strengths in standard mortar at 28 days were approximately equal to or a little above those of standard Portland. The 50:50 mix shows lower strengths than plain Portland at all periods. At reduced temperature (O. deg. C.) the initial strengths of the trassed cements are more affected than those of the Portland. The adhesion of iron to standard mortar is reduced by trass admixture. The shrinkage of mortars made from trass cement is higher than that of those made from Portland without trass admixture.

The commercial trass cements frequently have a considerably smaller content of trass than is marked on their packages. Their strength in the standard-mortar tests, with trass contents running up to 30 per cent., is often higher than that of standard Portland. However, the strengths attained actually in the concrete in plastic mixes are considerable lower than those of regular Portland, both absolutely and in relation to the strengths from standard-mortar tests. In plastic consistencies of approximately the same degree as Portland cement the trassed cements, tested in the form of concrete, showed an appreciably lower modulus of elasticity. The shrinkage of concrete made from trass-Portland cements with lower trass content (approximately 20 per cent.) is approximately as great as that of concrete made from Portland. The advantages claimed for these cements can not thus be substantiated.—Prof. Dr. A. Guttmann and Dr. F. Gille in *Tonindustrie-Zeitung* 56:43-45, 75-77, 90-92, Jan. 11, 18 and 20, 1932.

Proposed Classification for Construction Limes

German specifications for lime for construction purposes were standardized in 1911 in the three groups: (1) ordinary limes (fat limes), (2) mildly-hydraulic limes, and (3) strongly-hydraulic limes. These specifications have, of course, been subjected to reëxamination to keep them abreast of current needs, and the writer here proposes that new specifications be adopted on the basis of the following classification and descriptions:

(1) Building limes are mortar-binding materials formed by burning calcium carbonate of various kinds below the sintering limit. They are divided into several varieties, of which white lime and dolomitic lime are grouped together as ordinary limes, while hydraulic lime, dolomitic hydraulic limes, natural-cement limes, artificial-cement limes and Roman limes are grouped together under the general designation of hydraulic limes. The distribution of the varieties of lime depends on the content of the principal constituents, CaO, MgO, and silicate-forming constituents (Fe_2O_3 Al_2O_3 and soluble SiO_2). Other constituents are to be regarded as detrimental to quality; among these is silica insoluble in hydrochloric acid.

(2) White limes are those which contain not more than 5 per cent. MgO and not more than 10 per cent. silicate formers (proportioned to the useful constituents only and measured after ignition); the remainder being CaO. Dolomitic limes contain over 5 per cent. MgO and not over 10 per cent. silicate-forming materials. Hydraulic limes contain more than 10 per cent. of silicate-forming constituents, the remainder of the useful constituents being CaO and MgO, the MgO being higher in dolomitic hydraulic lime than in ordinary hydraulic lime. Because of similarity of properties, no standard specification is proposed to distinguish between them as varieties of hydraulic limes.

(3) Tolerances may be allowed in individual cases up to 2 per cent.—Dipl.-Ing. F. Eisemann in *Tonindustrie-Zeitung* 55: 1313-14, 1326-27 and 1342-44, Nov. 26, Nov. 30 and Dec. 3, 1931.

Workability of Alumina Cement Mixes Prolonged

Mortar or concrete mixes produced from some alumina cements show a stiffening within 20 or 30 min. of mixing, to some degree dependent on the temperature, even when their initial set does not take place until 3 or 4 hr. This decrease in workability is apparently to be attributed to the separation of aluminum hydroxide. In practice, the phenomenon has several disadvantages, such as the failure to fill corners of forms as well as freshly-mixed and readily workable mortar or concrete. The workability could, of course, be increased by adding water, but this is objectionable as it would lower the strength of the concrete.

The Hungarian firm Ungarische Allgemeine Kohlenbergbau Akt.-Ges. of Budapest has developed a process, on which a patent has been applied for (Hungarian application 11,168) which prolongs the workability of such mixes by means of admixtures. The admixtures so used are soluble nitrates, permanganates and chlorates, salts with an oxidizing action. In quantities of 0.1 to 1 per cent. of the cement content they prolong the stiffening of the concrete by 30 to 240 min. At the same time they retard somewhat the initial and final set. Thus, with an admixture of 0.2 per cent. of potassium chlorate the initial set was retarded from 4 to 7 hr., and the final set from 5 to 13 hr. The strength of the concrete is scarcely or not at all diminished, as the following figures show:

	Compressive strength of Concrete (*kg./cm.*²) After		
	1 day	2 days	7 days
Without salt admixture.....	802	878	932
With potassium chlorate.....	756	871	914

It is advisable to make the admixture of salt at the time the clinker is ground, so as to avoid mistakes or errors.—*Zement* 21:42, Jan. 21, 1932.

Recent Patents

AMERICAN

Cement and Concrete

Manufacture of cement. Karl Balthasar, Klagenfurt, Austria. No. 1,844,940.

Crushing and Grinding

Grinding mill. Frank J. Marshall, Easton, Pa. No. 1,846,061.

Excavating

Hydraulic-control apparatus for scrapers. McLennen C. Slate, Albany, Ore., assignor to Slate Construction Co., same place. No. 1,845,349.

Digging tooth. Van C. Mekeel, Oak Park, Ill. No. 1,845,677.

Power dipper trip. Alvin W. Anderson, Freeport, Ill. No. 1,845,779.

Dredging machine. Julius Geiger, Dolsthalda, Germany. No. 1,846,549.

Trench excavator. George T. Powell, New York, N. Y. No. 1,846,902.

Road Materials

Road-surfacing composition and method of making same. Sam E. Finley, Atlanta, Ga. No. 1,845,405.

Binding material for mineral aggregates of pavements and method of using same. Donald McK. Hepburn, Samuel S. Sadtler, and Eugene F. Cayo, Philadelphia, Pa., assignors to Amiesite Asphalt Co., Camden, N. J. No. 1,846,107.

Sand and Gravel

Sand-blending apparatus. Don A. Weber, Fort Wayne, Ind., assignor to Deister Concentrator Co., same place. No. 1,845,374.

Gravel tester. Virgil M. Hadoon, Valley, Neb. No. 1,845,709.

Screening and Separating

Sifter mechanism for conveyors. Harry H. Barber, Aurora, Ill., assignor to Barber-Greene Co. No. 1,848,668.

Screening mechanism. Harry H. Barber, Aurora, Ill., assignor to Barber-Greene Co., same place. No. 1,846,669.

FOREIGN

Cement and Concrete

Process and apparatus for the manufacture of molded articles from mortar or concrete. E. Freyssinet. British 366,544.

Cement surfacing substance. John Fillans Barr, Drogheda, County Louth, Irish Free State, and Dirk de Lange, assignee of Henri Martinus de Lange, De Bilt, Holland. Canadian 320,031.

Crushing and Grinding

Method of and apparatus for controlling or graduating the fineness of the products of grinding-machines. Soc. Anon. D'Ougree Marihaye. British 366,001.

Pulverizers. Erie City Iron Works. British 366,529.

Continuous crusher, mixer and rubber for foundry sand. Alfred Baillot, St. Ouen, Seine, France. Canadian 319,749.

Vibratory ball-mill. Charles Neville George Wilde, London, England. Canadian 319,926.

Drilling

Valve apparatus for rock drills and like fluid-pressure-operated tools. G. H. T. Rayner and P. T. Rayner. British 366,361.

Hollow drill-steel bar manufacture. Canadian Atlas Steels, Ltd., Welland, assignee of Roy Henry Davis, St. Catharines, Ont. Canadian 319,944.

Material-Handling

Conveying-apparatus. O. S. Sells. British 366,293.

Pneumatic conveyors. B. W. Dawkins. British 366,702.

Conveyors. H. Watson-Smith, W. R. Turtle, and Mining Engineering Co., Ltd. British 366,731.

Phosphate Rock

Process of leaching phosphate rock. Kunstdünger-Patent-Verwertungs-Akt.-Ges. British 366,547.

Sacking

Multi-ply paper bags. J. W. Winskill. British 366,620.

Screening and Separating

Shaking screens. E. Larsson and E. Petersson. British 366,886.

Silica

Method for the removal of colloidal silica from mixed solutions obtained during the treatment of powdered silicates with acids. G. A. Blanc. British 366,002.

Treatment of materials containing silica. E. J. Kohlmeyer. British 366,015.

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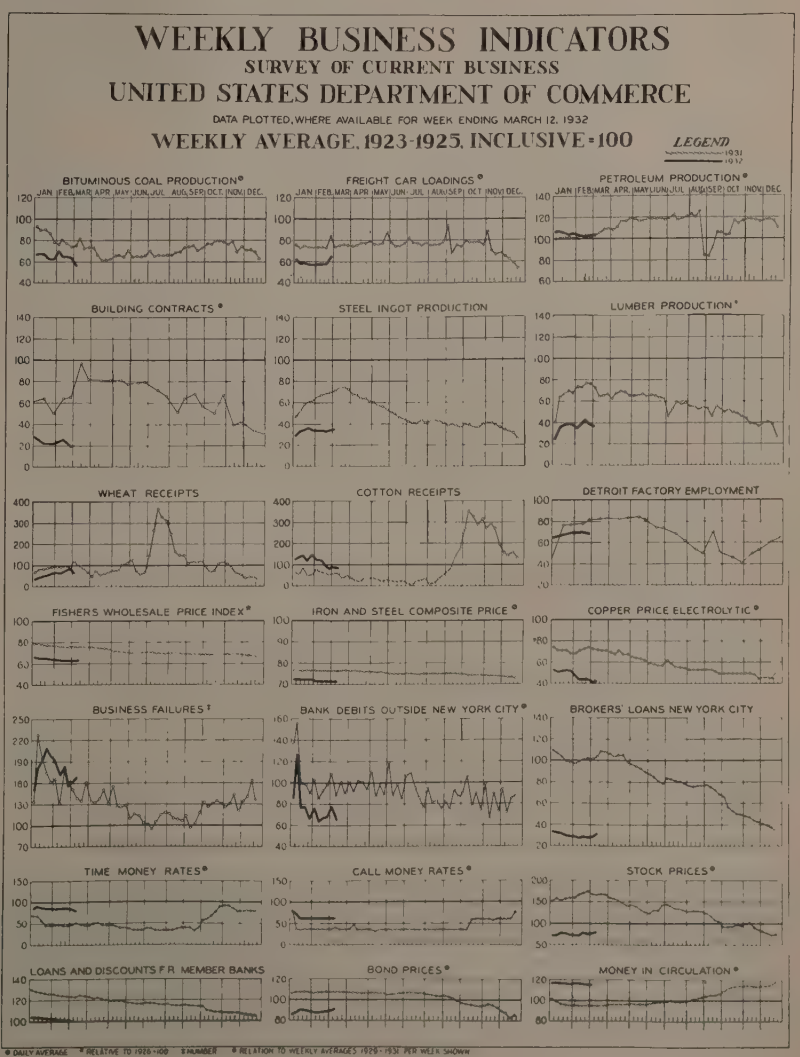

WEEKLY BUSINESS INDICATORS
SURVEY OF CURRENT BUSINESS
UNITED STATES DEPARTMENT OF COMMERCE
DATA PLOTTED, WHERE AVAILABLE FOR WEEK ENDING MARCH 12, 1932
WEEKLY AVERAGE, 1923-1925, INCLUSIVE = 100
LEGEND
1931
1932
BITUMINOUS COAL PRODUCTION*
FREIGHT CAR LOADINGS *
PETROLEUM PRODUCTION *
BUILDING CONTRACTS *
STEEL INGOT PRODUCTION
LUMBER PRODUCTION *
WHEAT RECEIPTS
COTTON RECEIPTS
DETROIT FACTORY EMPLOYMENT
FISHER'S WHOLESALE PRICE INDEX*
IRON AND STEEL COMPOSITE PRICE *
COPPER PRICE ELECTROLYTIC *
BUSINESS FAILURES †
BANK DEBITS OUTSIDE NEW YORK CITY *
BROKERS' LOANS NEW YORK CITY
TIME MONEY RATES*
CALL MONEY RATES*
STOCK PRICES*
LOANS AND DISCOUNTS F.R. MEMBER BANKS
BOND PRICES*
MONEY IN CIRCULATION *
* DAILY AVERAGE * RELATIVE TO 1926-100 † NUMBER * RELATION TO WEEKLY AVERAGES 1928-1931 PER WEEK SHOWN

Manufacturers' Publications

Each publication listed below contains information of interest to non-metallic mineral producers. Readers may obtain, without charge—except where a price may be stated—and without obligation, copies of any of these publications by writing directly to the manufacturers who publish them. Please mention PIT AND QUARRY *when writing.*

Bins

Butler Bins — Type "V". 16 p. (Bull. No. 100B. Butler Bin Co., Waukesha, Wis.) Describes and illustrates a line of steel bins for the storage and loading of materials. Sizes range from 20 to 110 cu.yd. capacity in two- and three-compartment types.

Bodies, Truck

Eastern Industrial Transportation. 12 p. (Bull. No. 40. Eastern Car & Construction Co., Easton, Pa.) Describes and illustrates a line of side-dump and rear-dump bodies for trucks as applied to quarry service. A list of quarries using this equipment and some interesting data on quarry-truck haulage make the booklet especially valuable; the data were obtained by means of a questionnaire by the company.

Conveyors

Jeffrey Belt Conveyors. 48 p. (Cat. No. 535. The Jeffrey Manufacturing Co., Columbus, O.) A detailed booklet on the subject of belt conveyors, showing their broad application in many industries. Tables showing standard belt sizes for handling various materials at required speed and capacities are included.

Diversified Conveying. 6 p. (The Traylor Vibrator Co., Denver, Colo.) Describes and illustrates a few of the conveyors made by this concern, including tubular vibrator conveyors and feeders for feeding and handling sand, coal, flue-dust, filter cake, etc.

Crushers

The Patterson Gyro-centric Crusher. 4 p. (The Patterson Foundry & Machine Co., East Liverpool, O.) A folder which describes and illustrates the crushing action of a simplified crusher employing an eccentric manganese-steel roll for the accurate and thorough reduction of materials.

Electrical Equipment

G. E. Thrustors. 24 p. (Bull. 1262B. General Electric Co., Schenectady, N. Y.) Describes and illustrates a device for producing a straight-line, constant-pressure thrust, designed to supply pressure and actuate lever mechanisms, and to replace muscular effort with electrical control on foot- or hand-operated machines. Some ingenuous examples of the Thrustor combined with photoëlectric-cell control are included.

Excavators

The Bay City Model B. 8 p. (Cat. No. B1. Bay City Shovels, Inc., Bay City, Mich.) A new catalog just off the press containing specifications, illustrations and details of the company's new full-revolving Model B, ⅜ cu.yd. convertible excavator. The machine can serve as a shovel, trench hoe, drag-line, etc.

Motors

The G. E. Supersynchronous Motor. 4 p. (Bull. 885B. General Electric Co., Schenectady, N. Y.) Describes and illustrates supersynchronous motors in two- and three-phase types with ratings of 100 to 4,000 hp. at speeds of 500 to 90 r.p.m. in appropriate combinations, particularly suitable for cement-mill service. Lists 12 cement companies as users.

Pulverizers

Raymond Pulverizing Problems. 16 p. (Raymond Bros. Impact Pulverizer Co., Chicago, Ill.) Describes and illustrates the new Raymond roller mill, mechanical air separator, Raymond Imp mill, Raymond Super mill, the No. 0000 pulverizer and other equipment.

Pumps

Small Pumping Plants for Sand and Gravel Production. 12 p. (Bull. 141. Morris Machine Works, Baldwinsville, N. Y.) Features centrifugal pumps, hydraulic dredges, dredge accessories and complete equipment for producing sand and gravel in plants of small and moderate capacities. Describes in detail the methods by which highly economical production is being obtained in many plants with simple equipment and limited investment.

Separators, Magnetic

Stearns Induction Magnetic Separators. 8 p. (Bull. No. 10. Magnetic Manufacturing Co., Milwaukee, Wis.) Describes and illustrates an induction magnetic separator for application in a wide range of industries. Contains a table showing the relative magnetic force of ore and minerals amenable to magnetic separation.

Unclassified

Safety in the Handling and Use of Explosives. 64 p. (Institute of Makers of Explosives, New York, N. Y.) A handy and informative book explaining in simple language each detail of safe practices to be employed in handling and using explosives. A considerable list of "don'ts" summarizes many of the most frequent causes of accidents.

Briggs Renewable Tip Hammer. 6 p. (William C. Briggs, Bankers Trust Bldg., Philadelphia, Pa.) Describes and illustrates the construction and advantages of a renewable tip hammer for replacement in hammer-mills.

Equipment Firm Changes Name, Adds to Personnel

The Ladel Conveyor & Manufacturing Co. is the new name of the Ladel Truck & Foundry Co., of New Philadelphia, O. The company made the change at the beginning of the year when it acquired the services of E. M. Platts, C. N. Bebinger and G. R. Whitnall, former officials of the Northern Conveyor Co., and J. S. Morrison, former president of the J. S. Morrison Co., vibrating-screen manufacturer.

The Ladel company is well-known in the pit and quarry industries. Recently, the firm took over the sales and manufacture of the Lee shaking conveyor. The company is also producing and marketing the Summit vibrating screen. It manufactures, in addition, a wide range of equipment used in this field, including elevating and conveying machinery, car unloaders, conveyors, feeders, scalping and revolving screens, feeders, and industrial trucks.

The company's research engineers have just developed a number of new products, including belt idlers and mining equipment incorporating some of the most advanced ideas pointing toward efficient, low-cost operation, according to G. R. Whitnall, manager of the conveyor division.

Remarks on Truck Costs in Quarries Corrected

In reporting the remarks of W. E. Farrell, president of the Easton Car & Construction Co., at the recent convention of the National Crushed Stone Assn. at Pittsburgh, PIT AND QUARRY credited Mr. Farrell with stating that the average cost of motor-truck haulage on trips up to 3,000 feet has averaged about 4 c. per ton.

What Mr. Farrell actually said was, "when, due to length of haul, the cost of haulage by truck from the quarry face to the crusher amounts to 4 c. per ton, the cost approaches the average haulage by locomotives and cars."

New Incorporations

GRAND RIVER PURE LIME CO., Miami, Okla. Capital, $25,000. T. B. Walker.

AUGUSTA LIMESTONE PRODUCTS, INC., Staunton, Va. Capital, $60,000. A. W. Higgins, Alexandria, Va.

VALLEY GRANITE & CONTRACTING CO., Harlingen, Tex. Capital, $25,000. W. F. Brown, J. R. Roberts and K. S. Richards.

CHOCTAW SAND & GRAVEL CO., Hugo, Okla. Capital, $25,000. L. R. Blakely, Hugo Hunter and E. R. Hunter, Paris, Tex.

WEST END SAND CO., Louisville, Ky. Capital, $50,000. R. R. Worrall, Catherine L. Worrall and Morton M. Worrall. (Reorganization of West End Sand Service.)

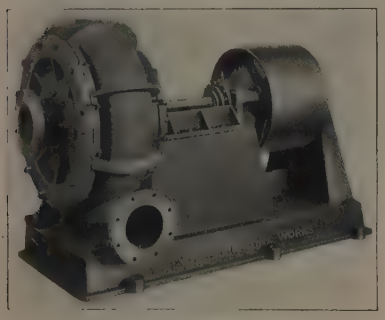
New Machinery and Supplies

Alloys Reduce Wear on Moving Parts in Pumps

During the past year Morris Machine Works has consistently followed its policy of continuously improving and extending its lines of centrifugal pumps, dredging machinery and materials-handling pumps.

For many years the company has specialized in centrifugal pumping machinery for handling liquids containing solid materials in suspension and most of its recent developments concern the various types which it manufactures for pumping sand and gravel, gritty mine water, slurry, pulp and sewage.

One of these improvements is in the bearings of Morris medium-duty and heavy-duty pumps for sand and gravel and for dredging service. The new type bearings are of the anti-friction type made long, heavy and rigid, so as to maintain perfect alignment of the shaft and impeller, which is particularly essential in these severe



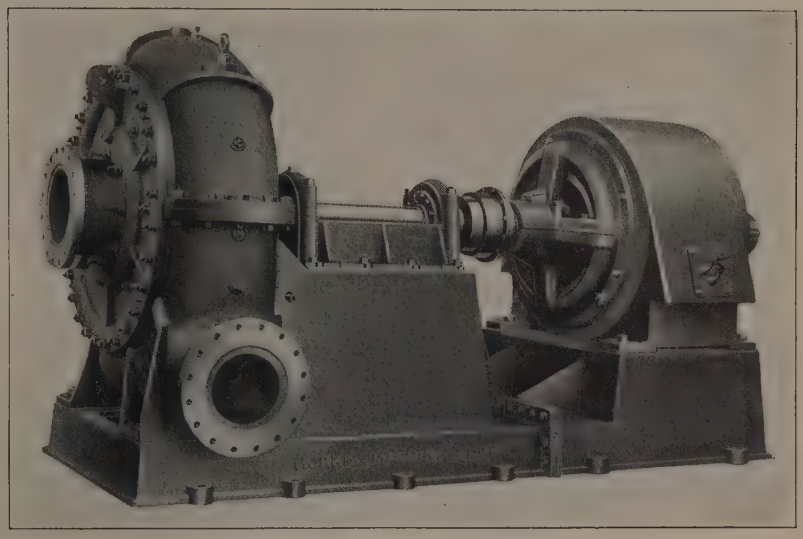
Belt-driven medium-duty pump.

services. The sub-base of these pumps has been stiffened and provides still more substantial support for the pump casings so as to prevent vibration.

The company has also developed new alloys with special properties which reduce the wear on running parts of pumps handling abrasive materials. The new Morris "Flintmetal" is a particularly hard iron, specially adapted to handling fine abrasives, such as slurry, grit and sand. Morris "Flintalloy" is a new steel mixture of which the hardness and brittleness can be controlled by heat treatment so as to suit various requirements when handling the larger abrasive solids encountered in dredging and other services.

Improvements which have been made on Morris water pumps, and new designs of these pumps which have been developed, apply particularly to the requirements of supply water for screens in sand and gravel plants, crushing plants and for general purposes.

Many outstanding plants built during the past year have installed Morris pumps to help assure maximum efficiency of operating and economy of maintenance, which are more essential to-day than ever before. Some of these installations, such as at the Consumers Gravel Co. at Franklinton, La., and Fluker, La., Welsh-Sandler Co. at Frisbie, Kan., and many other sand-and-gravel plants in these localities, have been described in recent issues of the trade journals, and other sections of the country and industries requiring abrasive-handling pumps are similarly well represented in the list of recent Morris installations.



Heavy-duty manganese-steel-lined pumping unit.

The company's plans for 1932 include the development of improved types of heavy-duty unlined pumps for sand-and-gravel production and dredging service, and additional special and general types of pumps which will be announced later in the year, still further advancing the completeness of the company's service to centrifugal pump users.

Sectional Conveyors in Standard-Size Lengths

The Fairfield Engineering Co., Marion, O., builders of elevating and conveying machinery, has recently increased its line to include sectional belt conveyors.

Belt conveyors of this type have found wide use in the construction field and among building-supply dealers and pit and quarry operators who find them more practical than portable equipment where the work to be done is semi-permanent or permanent in nature.

Fairfield sectional conveyors are built of standardized units, making it possible to readily extend any conveyor to suit the requirements of plant expansion. Standard head-and-foot end sections, of the proper size to provide for ultimate conveyor length, together with the required intermediate sections for initial use, are originally provided. Additional intermediate sections can then be added as desired. The use of easily assembled standardized units permits minimum installation costs both originally and as conveyors are extended.

Steel frames are usually furnished. However, if the purchaser prefers to furnish timber frames, complete sets of parts may be obtained.

The steel frame sections as furnished by Fairfield are of the Warren truss type securely welded throughout. The various units are joined together by means of heavy sleeve bolts. The return belt is protected by a sloping steel cover. The conveyor frames are designed for unusually long spans, thus avoiding the need of

View showing method of joining the sectional belt conveyors.

frequent supporting structures. They can be provided with or without walkways, as desired.

The sectional conveyors are built with belts 18 in. or 24 in. in width. Maximum capacities under ideal conditions, for material weighing 100 lb. per cu.ft. for the two sizes, are as follows: 18 in. belts, 160 tons per hr.; 24 in. belts, 290 tons per hr.

Ball-bearing idlers are used throughout in these conveyor sections. The units are driven either by electric motor or gasoline engine, depending upon the requirements of the buyer.

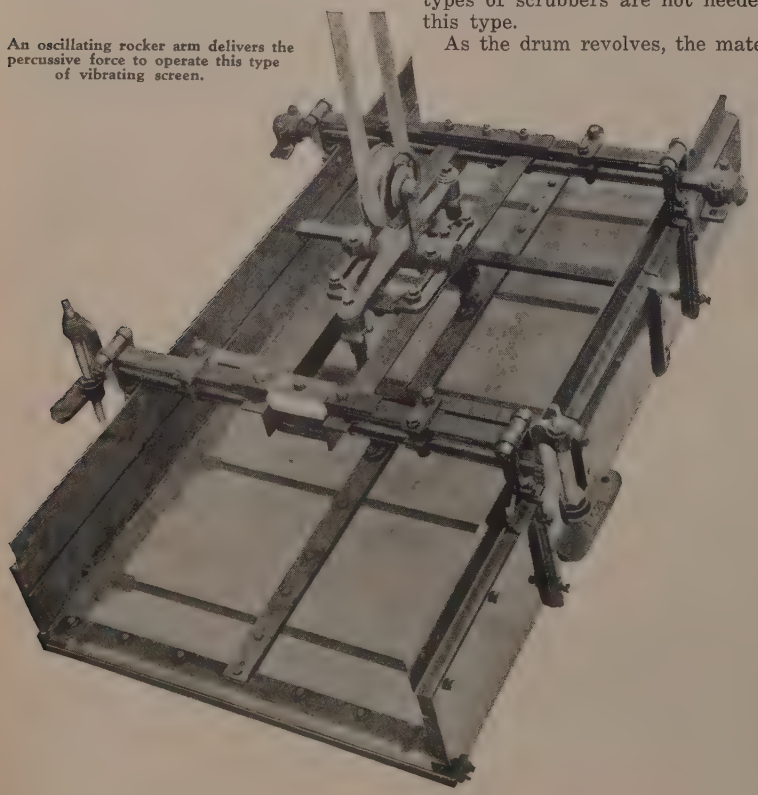
Percussion Screen Has Oscillating Rocker Arm

The Isbell percussion screen has been used for years in the mining trade and is now offered to the gravel and crushed-stone industries in an improved form. The unique principle of vibration embodies an oscillating rocker arm so arranged as to deliver extremely rapid shocks or percussions, alternately in opposite directions, to a tensioned screen and a resiliently suspended screen frame. The extremely rapid percussions, together with the correlative action of the screen frame, produces almost instant stratification and causes the machine to operate with remarkable efficiency.

The rocker arm proper is provided with a hammer head at each end which can be adjusted to strike a light or heavy blow, as required. It is oscillated by means of the unbalanced or weighted pulley, located directly over the center of it, every revolution of which causes the rocker arm to deliver four sharp resilient blows, or percussions, alternately in opposite directions, directly to both screen cloth and resiliently mounted frame in such a manner that every blow produces a vibratory shock that is equally effective over the entire surface of the cloth.

The rocker arm being provided with a torsion shaft, the entire assembly requires no lubrication whatsoever other than repacking of the weighted pulley with hard grease every six months to a year.

The hammer heads or rocker arms are free to rebound instantly when the blows are delivered, therefore the operating mechanism and motor does not lift the dead weight of material and screen frame. The power actually required to operate an Isbell Percussion Screen regardless of the size or load carried is less than ½ hp. It requires no more power to operate on the heaviest overload than when running empty. The Isbell screen is manufactured in two sizes, 32 and 44 in. widths, 68 in. long in single or multiple decks, by the Alloy Steel & Metals Co., Los Angeles.

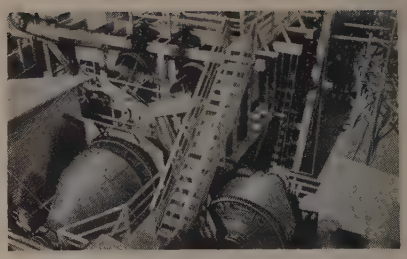


An oscillating rocker arm delivers the percussive force to operate this type of vibrating screen.

Conical Scrubbers Are an Outstanding Success

The Hardinge conical scrubber is a large conical drum rotated on trunnion bearings. Feed enters at one end and is discharged at the other end into a revolving trommel screen. Only sufficient water to coat the sand and gravel is introduced at the feed end. The large quantities required in other types of scrubbers are not needed in this type.

As the drum revolves, the material



Two conical scrubbers installed in a Florida pebble-phosphate mill.

within the scrubber is thoroughly mixed. The weight of the mass and the rubbing action of the material against itself, loosens the dirt and when the stone and gravel is discharged into the screen under a small stream of water, it is rinsed absolutely clean of all clay and silt.

The scrubber is built in 7 standard sizes, with a capacity range of 8 to 600 tons an hour. Repairs are practically nil, as there are no internal moving parts, no submerged bearings and no packing glands to maintain. Power costs are low and practically no operating attention is required.

Conical scrubbers have been used for years to clean phosphate pebble, one of the most difficult of materials to wash. Not only was the product improved when the change in operation was made, but a considerable reduction in production costs was obtained.

Trucks Have Gross Load Capacity of 50,000 Lb.

A new line of heavy-duty trucks, affording maximum haulage service with dependability of performance, is being offered producers of crushed-stone, sand and gravel, and other pit-and-quarry materials in the Dodge G-80 Series. This Dodge Brothers development completely fills the demand for a rugged tractor unit capable of handling gross loads of 50,000 lb.—swiftly, continuously and at low cost.

Features of the new line include an L-head, eight-cylinder motor with 385 in. piston displacement, delivering a maximum of 120 brake horsepower at 3,000 r.p.m. A five-speed transmission is employed to obtain all the necessary gear ratios. Side frames are 10 1/16-in. rails supported by 14-in. flanged truss members to insure strength and rigidity.

Four-wheel air brakes insure the positive control of the tremendous loads with which these trucsks may be loaded. Upwards of 50,000 miles of valve service have been obtained, an inserted valve seat of high-speed tool steel in combination with valves of special material making this possible. Central lubrication keeps the shackle and king-pin bolts constantly lubricated.

The G-80 series is available in standard wheelbase lengths of 146, 170, 195 and 220 inches. Any type of dump body or hoisting equipment is available.

Designs Portable Plant for Coating Aggregates

Producers of crushed-stone and sand and gravel have, in many instances, developed considerable extra business in obtaining contracts for the surfacing or construction of secondary roads, as well as for resurfacing old roadways, with bituminous-coated materials.

This type of mixture, up until recently, was usually prepared in a hot-mix plant. The high initial cost of these plants and the maintenance and operating costs resulted in a relatively high cost for the finished pavement. Cold-mix plants employing cut-back asphaltic mixtures were later employed, but difficulty developed in that the mixtures did not bond well with damp or wet aggregates.

Recently, it has been found that, by the use of a proper asphalt emulsion as a binding agent, many of the objectionable features of both the cut-back asphalt and hot mixtures are eliminated.

The problem of properly applying such emulsions to the aggregate has been solved with the development of a machine by The Saturmix Corp. of Wooster, O., which provides a means of immersing the aggregate in a bath of asphalt emulsion and withdraws it in a thoroughly coated condition ready for use. In brief, this process consists of supplying the aggregate to an immersion tank containing asphalt emulsion, in which tank is suspended a perforated basket so arranged as to be removed slowly, permitting drainage of the excess binding material. The perforated basket delivers the coated aggregate to a storage bin, from which point it is available for delivery to trucks in a reasonably dry, but thoroughly coated, condition.

The Saturmix plant, shown in the accompanying illustration, consists essentially of a framework supporting the emulsion tank, a storage bin, where a perforated basket is so arranged as to be capable of receiving aggregate while immersed in the emulsion tank, and then being so rotated as to slowly discharge the aggregate from the basket into the storage bin. The framework, emulsion tank, and storage bin, are all fabricated from steel plates and shapes of such size and strength as to withstand the hard service for which this machine is intended. The frame is of such size as readily to permit transportation from place to place, the overall width not exceeding that allowable for vehicles on highways. Provision is made on the machine frame for the attachment of suitable axles and wheels to facilitate such movement.

This process of coating aggregate involves a minimum of labor, as in the ordinary course of unloading aggregate and emulsions from railroad cars, it is possible to put this material through the Saturmix machine, practically as fast as it can be unloaded, and with the necessity of only one extra man, who is required to operate the machine. The material, when processed, is available in the storage bin for delivery to trucks. The capacity of the plant is 500 tons a day.

Plant for coating aggregates with asphalt emulsion.

Because of the portability of the machine, it is possible to change the set-up as often as may be desirable, thus minimizing hauling distances, and making it profitable to undertake small yardage contracts.

The Saturmix machine can be arranged for loading with a clam-shell, elevator, belt-conveyor, chute, or other means, and emulsion can be drawn from railroad cars, tanks, or other containers. The machine is, therefore, adaptable to practically any condition that may develop.

Since this process involves primarily the use of asphalt emulsion, it is possible to secure satisfactory results using aggregates which are wet. In fact, it is recommended that to secure uniformity, the material to be coated should be wet. In freezing weather the aggregates should be steamed before use.

Provision is made for the proper drainage of the coated aggregate when the immersion basket is being drawn from the emulsion tank, and further drainage is provided in the storage bin, so that the aggregate, as delivered to the trucks, has complete coating of the proper thickness, but there is no excess to be lost by dripping from the truck in transit.

Aside from three simple, easily accessible units, namely, the gasoline engine, pump, and the hoisting mechanism, there is only one moving part in the machine—a substantially constructed, perforated basket carried on a heavy shaft, arranged to slowly rotate in its bearings.

Vibrating Screens for Heavy-Duty Separation

Two new types of vibrating screens have just been announced by Link-Belt Co., Philadelphia, Pa. These screens are known as:

(1) Link-Belt positive-drive-type, heavy-duty vibrating screen, which is made with both single and multiple decks.

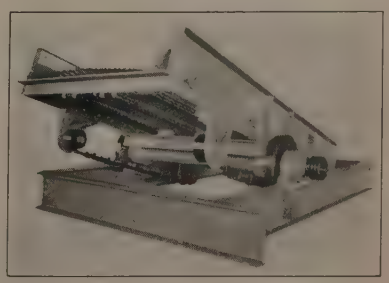
(2) Link-Belt unbalanced-pulley-type, heavy-duty vibrating screen, made with single and multiple decks.

These two additions to the Link-Belt line of vibrating screens fill industry's needs where large screen openings are required and heavy capacities must be handled.

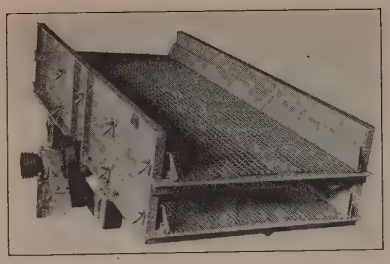
The positive-drive-type can be furnished to provide any given fixed amplitude, with shaft speeds to suit.

In the positive-drive-type of screen, the amplitude of vibration is fixed at the factory, before shipment, to suit the work the screen is to do. Any given amplitude will cover a wide range of screening surface openings. The angle of the screen inclination, the speed of operation and the direction of the rotation, all are readily changed at any time to suit the kind, size and condition of material to be screened. The rotation determines whether the vibrations are with or against the flow of the material.

The double-deck screen illustrates the accessibility of the screen cloths, and that they are placed under tension crosswise by side tension members which also serve as wearing plates and prevent material from leaking along the edges. Only the screen



Positive-drive screen from the feed end.



A view of the double-deck screen.

cloths need to be removed when replacements are required.

Cantilever leaf springs serve to maintain the screen box at a constant angle, being adapted for the circular motion produced by the action of the eccentric-driven positive drive. Oversize self-aligning spherical roller bearings are used. A steel sub-frame is regularly furnished as a part of the screen, and it can be supported from below, or hung by cables from above.

The unbalanced-pulley-type, heavy-duty screen is available with single or multiple decks, for high-speed work where the material is of a sticky nature, and on close-sizing problems where the screen openings are not large.

The total movement, or amplitude, of the screen can be varied by the user, from zero to about ¼ in., by simply changing the counterweights in the weight containers—a valuable feature where screen cloth openings must be changed frequently, and when the condition of the material handled is likely to vary as to moisture content, etc. The angle of the screen and the speed and direction of operation can also be changed readily by the user, to suit operating conditions.

The entire weight of the screen box rests on the cantilever leaf springs, and responds to the reactions therefrom. The bearings, the method of applying screen cloth, and the cantilever leaf spring design, are the same as on the positive-drive-type of screen, above referred to.

Folder 1262 covering the new Link-Belt Vibrating Screens, giving dimensions, clearances, etc., will be sent upon request to the Link-Belt Co., 2045 West Hunting Park Ave., Philadelphia, Pa.

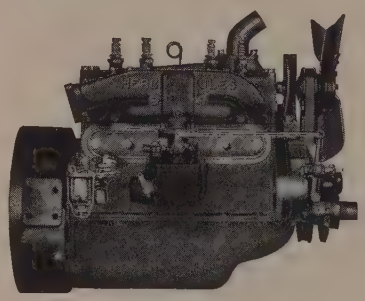
Produces Small Series of 4-Cylinder Engines

The Hercules Motors Corp. of Canton, O., in announcing the IX series engines and power units has added the following models to its present line of heavy-duty four- and six-cylinder engines, thus giving a complete range of sizes of from 9 to 175 hp.:

Model	Bore	Stroke	Displacement
IXA	3 in.	4 in.	113.1 cu. in.
IXB	3¼ in.	4 in.	132.7 cu. in.

The two models are identical in general design and the majority of the parts are interchangeable; the only difference being in the bore sizes and the parts affected thereby. The maximum torque of the IXA is 76 lb. developed at from 1,400 to 2,400 r.p.m. and on the IXB is 90 lb. developed from 1,400 to 2,300 r.p.m. Both models peak at 3,200 r.p.m., the IXA developing 39½ hp., and the IXB 46½ hp. at this speed.

To meet present-day operating conditions calling for sustained high speed, special consideration has been given to valve cooling. The engines and power units are equipped with a No. 5 standard S. A. E. bell housing, but the No. 4 and No. 6 type can be supplied upon request. Standard practice includes thermo-syphon cooling, but water pumps are available if specified. Either down-draft or up-draft manifolds are optional.



Heavy-duty engine from the manifold side.

Lubrication is of the full force-feed type to the main bearings and connecting-rod bearings. The pump is located beneath the center main bearing and driven from the camshaft by helical gears. The shafts and gears of the oil pump are case-hardened, insuring long life to this unit. Oil pressure can be adjusted easily to suit operation requirements.

As in all Hercules engines, the IX series have the crankcase cast integral with the block. The crankshaft is 2 in. in diameter at the three main bearings, of which the front bearing is 1 9/16 in. long, the center bearing 1⅝ in. long and the rear bearing 1⅝ in. long. The connecting rod bearings are 1¾ in. in diameter and 1⅛ in. long, and the center-to-center length of the connecting rod is 6 9/16 in.

The pistons normally are of cast iron and carry three rings above the pin. The lower of these rings is of the oil-regulating type. The compression rings are ⅛ in. wide and the oil rings 3/16 in. Piston pins are of nickel-molybdenum steel and are ⅞ in. in diameter. Each pin is securely locked in its connecting rod by a clamp bolt, and operates in two hard cast bronze bushings in the piston. Aluminum pistons can be supplied.

The IX type standard power unit.

Scale Blower a Feature of New Drill Sharpener

The Gardner-Denver Co., Quincy, Ill., has increased its series of drill-steel sharpeners with the introduction of the Model DS-6, a larger and more powerful sharpener.

Equipment can be supplied for handling any size of hexagon, quarter octagon, or round steel. Double taper bits up to 3 in. on steel up to and including 1½ in. round can be forged and sharpened.

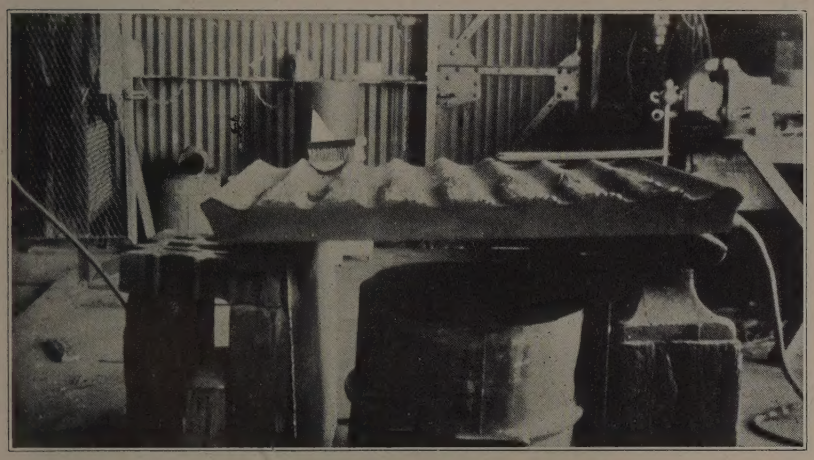
The machine incorporates a new and distinctive scale blower operated by a small lever placed on the right-hand side of the machine within easy reach of the operator. A slight movement of this handle thoroughly cleans all scale from the dies.

New drill-steel sharpener.

Specifications on this machine give the height overall as 48¼ in.; weight 2,000 lb., and diameter of round base 28 in. Complete information on this, and other sharpeners offered by the Gardner-Denver Co. is contained in a new sharpener bulletin DSE-1. Copies may be secured from any of the company's branch offices or direct from the main office at Quincy, Ill.

The Pacific Lime & Plaster Co. and the United States Lime Products Co. have moved their San Francisco, Cal., office from 58 Sutter St. to 85 Second St.

Hard-Facing Material Prolongs Life of Jaw-Crusher Plates



Jaw-crusher plate built up with hard-facing material.

In these days when the saving of a dollar is studied from all angles, industries are looking over their equipment with the idea of reclaiming much of that which was formerly replaced when it was worn out.

Abrasion is always the enemy of machinery of all types. When steel clashes on steel, or dust interferes with good lubrication, or earth and stone grind away metal parts, then some piece of apparatus will show a decrease in life. Replacement means increased operating expense, loss of time in production, and perhaps complete paralysis of output until the new part is received and installed. To abolish as much of this costly and frequently unnecessary loss of time as possible, many plants are inspecting their equipment with an eye to salvaging a vast amount of material by rebuilding and hard-facing.

One plant in the Middle West found that it was possible to reclaim worn jaw-crusher plates by this process at a considerable saving. Fabricated from steel, these plates rapidly wore away and soon required replacing. This resulted in the scrapping of an appreciable amount of steel each year. In order to diminish this loss the company rebuilt the plates in the manner shown in the accompanying illustration.

The plate was supported in a horizontal position, and a salamander was used during the building up process for preheating the part in order to prevent cracking. The worn ribs were then built up one layer at a time with Hascrome welding rod until a thickness of ¼ in. had been obtained. By applying the Hascrome in this manner more even distribution of heat was obtained, producing a good bond with the base metal and a minimum amount of warpage.

Hard-facing was also satisfactorily tried by an operator in the Southwest. In this particular case there were no spare jaws available, so it was necessary to build up the plates in place in order to reduce to the minimum the time lost from a shut down. Since the opening between jaws varied from 40 in. at the top to but 6 in. at the bottom where it was desired to deposit the Hascrome, the operator was forced to work from above, and in comparatively cramped quarters. In order to prevent arcing of the rod from both ends a rubber tip similar to that used on drawing pencils was placed over the upper end of the rod.

Since the jaws were bolted rigidly in place, warping was reduced to a minimum. Furthermore, the deposit of hard-facing alloy was staggered so that the welding heat was not concentrated in one part of the plate. A worn rib was not completely built up in one operation, but one layer was applied and then a layer laid down on another rib some distance away. The first layer was allowed to cool completely before the next layer was deposited.

This method of salvaging worn crusher plates was found to be decidedly economical because the saving resulting from decrease in time lost and increase in life was considerably greater than the expense of rebuilding. Hascrome is a self-hardening chromium-manganese-iron alloy, supplied in the form of welding rod, and may be applied by either the oxy-acetylene or the electric arc process. Where large castings are to be rebuilt as in the case of crusher plates, the electric arc process is preferable because there is less danger of cracking or warping the piece.

BUILDING-MATERIAL PRICES, FEBRUARY, 1932

Data collected by the Bureau of the Census and prepared by the Division of Building and Housing, U. S. Bureau of Standards.

City	Portland Cement (*bbl.*)	Gypsum Plaster (*ton*)	Gypsum Plaster Board (*1,000 sq. ft.*)	Hydrated Lime (*ton*)	Building Sand (*cu. yd.*)	Crushed Stone (*ton*)	Roofing Slate (*100 sq. ft.*)
Akron, O	$1.74	$14.00	$.....	$12.00	$1.50	$2.50	$12.00
Albany, N. Y	2.34	16.20	23.85	15.75	.....	.....	.....
Atlanta, Ga	2.55	20.25	36.00	15.50	2.81	2.50	.....
Baltimore, Md	2.10	14.50	25.00	13.00	1.85	2.50	10.00
Buffalo, N. Y	2.95	16.00	21.00	18.00	2.50	2.05	12.00
Cincinnati, O	1.94	.....	22.75	14.40	2.63	2.55	.....
Cleveland, O	2.00	15.00	.....	10.00	1.69	2.15	16.00
Columbia, S. C	2.28	17.00	35.00	11.00	1.50	2.60	14.00
Columbus, O	2.35	14.40	.....	12.00	1.50	2.75	14.00
Des Moines, Iowa	1.82	14.00	23.50	18.00	1.40	4.15	15.00
Detroit, Mich	2.00	15.00	25.00	12.00	2.03	1.75	.....
Erie, Pa	2.10	16.00	22.50	16.00	2.00	.....	.....
Fairmont, W. Va	2.75	18.00	35.00	16.00	2.70	3.50	13.00
Grand Forks, N. D	2.60	18.75	.....	16.25	2.60	.....	.....
Haverhill, Mass	2.60	18.50	25.00	.....	.....	.....	.....
Kansas City, Mo	2.10	17.00	25.00	22.00	1.60	1.88	16.00
Lansing, Mich	2.25	17.50	.....	20.00	1.80	1.80	.....
Los Angeles, Cal	2.30	15.20	23.50	24.70	1.85	1.90	.....
Louisville, Ky	1.86	17.00	.....	15.00	2.00	2.15	.....
Milwaukee, Wis	1.20	.....	22.00	.....	1.25	1.25	.....
New Bedford, Mass	2.40	16.50	24.00	16.25	1.50	2.75	.....
New Haven, Conn	2.40	.....	.....	15.00	1.50	2.00	.....
New London, Conn	2.05	18.00	25.00	18.00	1.20	2.50	.....
New Orleans, La	2.35	18.00	37.20	14.00	2.75	.....	10.50
Paterson, N. J	2.00	17.50	24.00	18.00	1.50	2.10	12.00
Philadelphia, Pa	2.10	17.50	.....	13.75	1.75	2.60	11.22
Poughkeepsie, N. Y	1.95	13.00	.....	26.00	2.25	2.20	.....
Richmond, Va	2.90	18.00	.....	21.00	1.65	2.10	10.50
Rochester, N. Y	2.28	16.00	22.00	14.50	2.25	2.40	12.00
St. Louis, Mo	2.00	16.00	.....	16.00	1.35	1.65	12.00
St. Paul, Minn	2.15	17.00	21.00	19.00	1.25	1.75	11.50
Saginaw, Mich	1.90	18.00	25.00	16.00	2.25	2.20	14.00
San Antonio, Tex	2.41	17.15	42.00	20.00	2.15	2.35	16.50
San Francisco, Cal	2.25	17.30	45.00	22.50	1.40	1.60	12.50
Savannah, Ga	2.35	16.50	27.50	21.50	1.75	3.50	14.00
Scranton, Pa	2.40	19.00	.....	20.00	4.39	.....	.....
Sioux Falls, Ia	2.00	15.00	40.00	22.00	1.25	2.00	.....
Syracuse, N. Y	2.60	14.00	20.00	.....	1.80	1.60	8.00
Tampa, Fla	2.60	20.00	.....	24.00	2.00	3.25	.....
Terre Haute, Ind	2.00	18.00	28.00	18.00	1.25	3.00	13.25
Toledo, O	1.40	14.00	20.00	12.00	1.60	1.60	.....
Trenton, N. J	2.10	16.75	23.00	18.00	.90	1.05	9.80
Tucson, Ariz	3.29	17.10	45.00	29.00	1.25	2.25	.....
Tulsa, Okla	1.90	16.00	22.50	22.50	.85	2.35	.....
Washington, D. C	1.65	14.00	25.00	12.00	.....	.....	.....
Waterbury, Conn	2.60	20.00	30.00	20.00	1.25	2.45	15.00
Wichita, Kan	1.75	15.50	25.00	22.50	1.00	.....	.....
Youngstown, Ohio	2.43	18.00	23.25	16.00	2.50	2.50	14.00

*Progress in Quarry Safety**

By W. W. ADAMS
U. S. Bureau of Mines

NINETEEN-THIRTY was a good year for the quarry industry so far as the prevention of accidents is concerned. In fact it was the best year that the industry has ever experienced. Only once before has the death rate been as low as it was that year, and the rate for nonfatal injuries was the lowest since complete records of injuries have become available.

Employment was not as good as in 1929. This is not surprising, in view of the general industrial conditions that prevailed in 1930. Measured by the number of man-shifts worked, employment was 10 per cent. lower than the previous year's level. The average employee worked 255 days, or 13 days less than in 1929.

A reduction in employment means a smaller amount of exposure to accident-hazards; therefore it was reasonable to expect that fewer men would be injured in 1930. As a matter of fact fewer men were injured, and the reduction in the number of injuries was proportionately greater than the reduction in employment. Employment declined 10 per cent.; the number of accidents declined 24 per cent. Accidents dropped from a rate of 130 per thousand 300-day workers in 1929 to only 110 per thousand 300-day workers in 1930. In other words, the accident-frequency rate was reduced 15 per cent. When it is recalled that a 1-per cent. reduction in the accident rate was recorded in 1929 as compared with 1928, and that the 1928 rate was 20 per cent. lower than that of the year before, a further reduction of 15 per cent. in the rate for 1930 is an accomplishment that indicates a growing interest in safety on the part of stone producers of the country.

The marked reduction in the accident rate in 1930 is notable because of the conditions under which it was accomplished. Safety often suffers a set-back during times of irregular employment or part-time operation, a condition that prevailed so widely in 1930. When such conditions prevail, the *morâle* of the employees is lowered, the men worry over inadequate or uncertain income, and often both men and management pay less attention to good-housekeeping from a safety point of view. These factors often lead to an increase in the accident rate among employees, yet in 1930 we find an entirely different result. Accidents were not only fewer in number than in the preceding year, but the frequency rate per thousand 300-day workers was also lower than in 1929. It is probable that the conditions from which quarrying and other industries suffered last year had the effect of eliminating many accident-prone employees and those otherwise inefficient, and of retaining on the payroll, for such work as was available, the more efficient workers. As efficient workers are usually the safest workers, this seems to me to be the most probable cause of much of the progress in safety made under the unusual conditions that prevailed in 1930.

This progress was not confined to any one kind of quarrying. All branches of the industry shared the improvement. Outstanding in accomplishment was the progress made by quarries and mills engaged in the manufacture of cement. This branch of the industry led all others by reducing its accident rate 22 per cent. Limestone quarries not connected with the cement industry ranked second with a reduction of nearly 17 per cent. Tying for third place in the amount of progress made were trap-rock quarries and granite quarries, each of these groups having a reduction of 13 per cent. in its accident rate as compared with the rate for the year before. Next in order were sandstone and bluestone quarries with a reduction of more than 8 per cent. in accident-frequency. Then came slate quarries whose progress amounted to 7.6 per cent. Marble quarries came last with a reduction of 4 per cent. in the accident rate.

These figures represent progress only; they do not represent the relative hazards of the several classes of quarries, but rather a step made by each group in 1930 over its own position in the previous year.

The accident-frequency rates for each class of quarries in 1930 and 1929, also the percentage of reduction represented by the rate for 1930, are shown in Table I.

Table I.—ACCIDENT RATES PER THOUSAND 300-DAY WORKERS AT QUARRIES, 1929 AND 1930, AND PERCENTAGE OF REDUCTION OF 1930.

Kind of Quarry	Accident Rate		Decrease in 1930 (*Per Cent.*)
	1929	1930	
Cement	44.68	34.96	21.8
Limestone	173.33	144.55	16.6
Trap-rock	223.00	193.64	13.2
Granite	166.34	144.50	13.1
Sandstone and bluestone	135.38	124.30	8.2
Slate	165.22	152.61	7.6
Marble	96.41	92.48	4.1
Total	129.79	109.76	15.4

These figures, showing an average of 15 per cent. reduction in the accident rate for 1930, also show that the reduction ranged from 4 per cent. for marble quarries to 22 per cent. for quarries producing stone for the manufacture of cement. It is well known that the cement industry has long been a leader in accident-prevention work.

Stone is quarried in nearly all states of the Union. Yet in only 13 states is the quarry industry of such magnitude as to require the services of as many as 2,000 men. These 13 states taken together represent approximately 70 per cent. of the entire industry, when measured by the number of men employed. When considered as a group, they had fatality and injury rates that were slightly more

Table II.—ACCIDENT RATES PER THOUSAND 300-DAY WORKERS AT QUARRIES IN THE 13 PRINCIPAL QUARRYING STATES IN 1930 COMPARED WITH 1929, AND PERCENTAGE OF REDUCTION IN 1930.

State	Accident Rate		Decrease in 1930 (*Per Cent.*)
	1929	1930	
Georgia	127.12	65.00	48.9
Illinois	116.40	69.19	40.6
Alabama	167.70	102.13	39.1
Ohio	128.33	92.11	28.2
Michigan	79.29	58.28	26.5
Missouri	218.82	167.57	23.4
Tennessee	119.55	99.75	16.6
New York	133.67	117.12	12.4
Indiana	99.12	90.61	8.6
Pennsylvania	95.07	94.66	0.4
California	159.18	164.17	3.1 (increase)
Vermont	100.75	108.14	7.3 "
Massachusetts	208.32	258.21	23.9 "

* Presented at the National Safety Congress, 1931.

favorable than the rates for the smaller states.

The figures in Table II show how these 13 important states stood in 1930 and 1929, based upon their accident-frequency rates.

It will be observed that ten out of the 13 states lowered their accident rates in 1930. The reductions ranged from nearly 49 per cent. in Georgia to less than 1 per cent. in Pennsylvania. Three of the 13 states suffered an increase in their accident rates; these were California, 3 per cent.; Vermont, a little over 7 per cent.; and Massachusetts, nearly 24 per cent.

If we take 1925 as a point of beginning and compare the record for that year with the record for 1930, we find a reduction of 36 per cent. in the accident-frequency rate during the latter year; 36 per cent. reduction in the accident-rate as compared with 5 years earlier; 15 per cent. reduction as compared with one year earlier. Certainly the quarry industry as a whole is making rapid strides in the prevention of accidents.

How true this statement is may be seen by considering what the death and injury losses of the industry would have been if the accident rate of 1925 had continued through 1930. In 1925 there were 1.78 men killed and 170 men injured for every 300,000 man-shifts of labor performed. During the five years since that record was made, the quarry industry has worked more than 117,000,000 man-shifts. In connection with this work 639 lives have been lost and 54,455 men have been injured by accidents. These losses are lamentable from any point of view, but they are not as great as they would have been if the 1925 rate had continued. If the quarry industry had not been able to lower its accident rate since 1925 there would have been 58 more men killed and 11,951 more men injured than the record actually shows. And yet we occasionally hear the question asked, "Does accident-prevention work pay?"

The average age of men killed in industrial accidents is 25 yr. A man 25 yr. old may reasonably expect to remain useful in industry for 20 yr. more. As quarries normally average 250 workdays a year, the saving of 58 lives during the past five years means a saving of $1,450,000 in wages to these 58 men and their families, assuming an average wage of $5 a day. This amounts to a saving of $25,000 in wages for each of these 58 men over a life-expectancy of 20 yr. that would have been destroyed if the industry had made no progress in the prevention of accidents during the past 5 yr.

Now what of the 11,951 who would have been injured if quarry operators had made no progress in safety? When men are injured by accidents in quarries, the average period of disability is 18 days. At $5 a day the prevention of these accidents means a saving of $1,075,590 in wages to these men who otherwise would have been injured. This saving is conservatively estimated because I am assuming that the injuries which might have occurred would not have included any cases of permanent or partial disability.

It may, therefore, reasonably be said that safety work at quarries during the past 5 yr. has resulted in saving $1,450,000 in wages to 58 men who would have been killed and $1,075,590 in wages to 11,951 men who would have been injured if the quarry industry had made no progress in the prevention of accidents.

Continued interest in safety is the surest guarantee of continued progress in the prevention of accidents. Intermittent interest is almost sure to be reflected in higher accidents rates. In this connection consider those companies that have been enrolled in the National Safety Competition which is conducted annually by the United States Bureau of Mines. These annual safety contests cover both mines and quarries. The first contest was in 1925 and there has been a marked increase in the number of companies enrolled since then. In fact, if the number of companies enrolled may be taken as a gage of an industry's interests in the prevention of accidents, the quarry industry is more alive to the safety of its workers than any other group represented in these yearly safety competitions.

The contests cover not only quarries, but coal mines, metal mines, and other classes of mines, and quarries comprise about half of the total enrollment. In the first year's contest 103 quarries entered the contest; this number has increased to 201 during 1931. These quarry companies employ about one-fourth of the total number of all quarry-pit workers in the United States. To a considerable degree, therefore, the accident experience of these companies is a fair sample of the experience of the whole quarrying industry.

The companies taking part in the National Safety Competition have established an enviable safety record. Some of the companies have been participating every year since 1925; others have enrolled in later years. Considering them as a group from year to year, there has been uninterrupted downward trend in the accident-frequency rates during the six years during which the contests have been conducted. The progress made has been most impressive. In the first year accidents were occurring at these quarries at the rate of 48 accidents for every 1,000,000 man-hr. of exposure; during the last year, 1930, accidents occurred at the rate of only 22 accidents per 1,000,000 man-hr. of exposure. The annual rates were as follows:

1925	48.259
1926	43.241
1927	33.537
1928	29.327
1929	26.782
1930	22.073

In view of the fact that records covering the entire quarry industry in the United States show a 36-per cent. reduction in the accident-frequency rate since five years ago, and that records covering all quarry companies in the National Safety Competition show a 54-per cent. reduction during the same period, no better evidence can be produced of the widespread interest of operators in the prevention of accidents and of the effectiveness of the industry's efforts to protect the employees from injury.

Alabama Cement Plants Hold Safety Gathering

The Portland Cement Assn. opened its 1932 series of regional safety meetings on February 19 at Birmingham, Ala., when representatives of cement plants in that area gathered at the Tutwiler Hotel. Mills of the Alpha Portland Cement Co., Lehigh Portland Cement Co., Lone Star Cement Co., Alabama, and the Universal Atlas Cement Co. sent delegates.

Speakers at the meeting included A. W. Brown (Lehigh), E. P. Lipscomb and J. J. Woodman (Lone Star), and B. E. Merrell (Universal Atlas), I. C. Brotzman (Lone Star) acted as chairman of the session, while Mr. Merrell served as toastmaster at the banquet held in the evening. Allen Loehr of the Birmingham Chamber of Commerce was the banquet speaker and the entertainment was arranged by Mark Small, district engineer for the association at Birmingham.

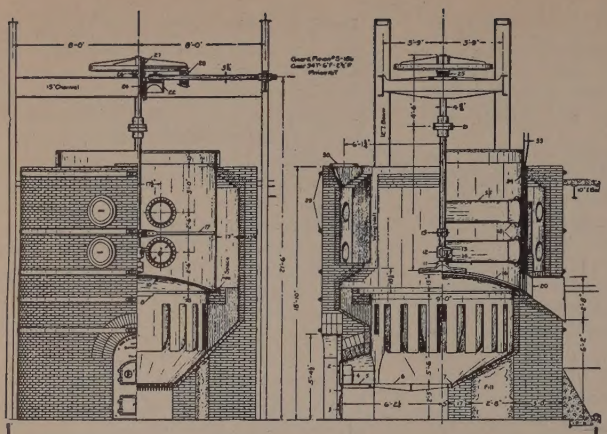
Old Instrument Concern Opens New York Offices

R. Fuess, Inc., known throughout the world for the manufacture of instruments for scientific research and industrial control, has opened an American office at 245 West 55th St., New York, N. Y. A German concern, with works at Berlin and Steglitz, it was founded in 1865 by Rudolph Fuess, and the traditions of the company are being carried on by Paul Fuess, the son of the founder.

Of particular interest to the pit and quarry industries, the concern makes and markets instruments for the estimation of pressure, temperature and humidity of the air, for measuring the velocity, quantity and pressure of air and gases, microscopes for laboratory work, water gauges, quantity meters of water, chronographs, and instruments for recording the shoring-up pressures of shafts leading to underground workings.

Quebec Issues January Figures on Production

Quebec produced 96,257 bbl. of cement, 8,281 tons of lime and 10,190 tons of asbestos in the month of January, according to the official report issued by the Provincial Government.



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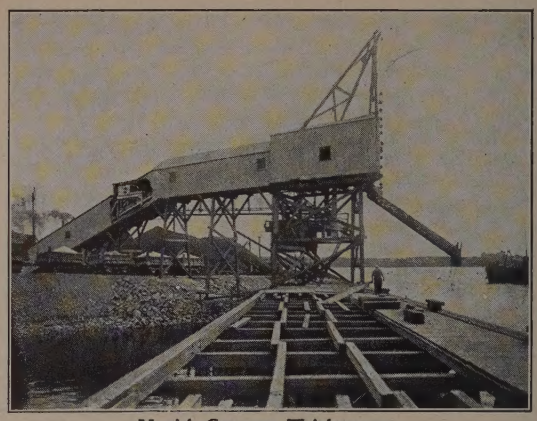

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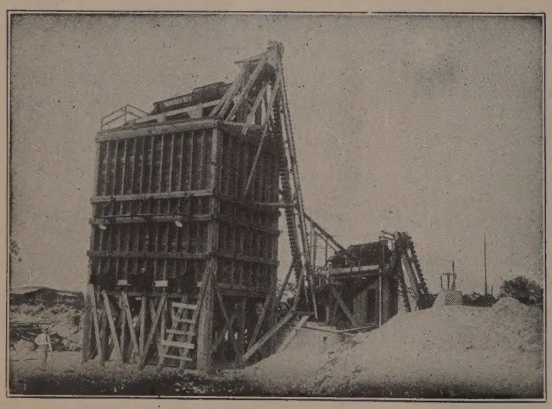

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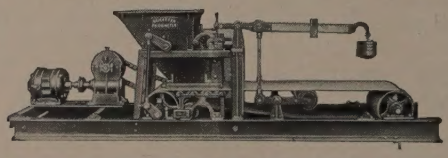

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